FISCAL YEAR 1987 NOAA AUTHORIZATION

HEARING

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT

OF THE

COMMITTEE ON SCIENCE AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

NINETY-NINTH CONGRESS

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**Serving on Committee on the Budget for 99th Congress.

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April 10, 1986:

Dr. Anthony J. Calio, Administrator, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, accompanied by Kathleen Charles, Deputy Director, Budget and Finance, NOAA; Richard Hallgren, Assistant Administrator, National Weather Service; Alan Thomas, Deputy Assistant Administrator, Oceanic and Atmospheric Research; and William Bishop, Acting Assistant Administrator, Satellite and Information Services 7

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FISCAL YEAR 1987 NOAA AUTHORIZATION

THURSDAY, APRIL 10, 1986

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE
RESEARCH AND ENVIRONMENT,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:27 a.m., in room 2318, Rayburn House Office Building, Hon. James Scheuer (chairman of the subcommittee) presiding.

Mr. SCHEUER. Good morning. The subcommittee will come to order.

Today, the Subcommittee on Natural Resources, Agriculture Research and Environment holds the first of two hearings to examine the 1987 budget for the National Oceanic and Atmospheric Administration.

We are very happy to welcome the new NOAA Administrator, Dr. Calio, today. When we had our hearings last year, you were yet to be confirmed, Dr. Calio. I think it would be fair to say that the agency was demoralized. It was suffering from internal dissension, poor morale, malaise, torpor. They perceived, and we perceived, that they were lacking support from the Administration, and that obviously affected them in their work and concerns us very, very deeply.

Since you have been confirmed, Dr. Calio, I am happy to say that we have noticed a visible improvement down there. Under your leadership, NOAA has returned substantially to its congressionally mandated mission. We very much appreciate the job you have done in revitalizing NOAA and vastly improving the morale and the languor and the malaise and the torpor that characterized the human condition there only just a year ago.

We applaud also your efforts to bring 20th century technology to bear on the various missions of the National Weather Service. So, we commend you for having made an excellent start.

Forgive us for saying that, in our perception, there are very serious problems that still remain. The Administration is still continuing a policy toward NOAA that ranges between neglect and open antipathy. While similar Federal agencies have suffered 10 percent cuts at the worst, NOAA's budget proposes a 25-percent cut in the funding and a 16-percent cut in manpower in a single year. While other science agencies, such as the National Science Foundation and NASA, are slated for funding increases, research and development at NOAA is being cut by over 30 percent. We find this as difficult to comprehend as we do to accept.

Recent developments in oceanography, satellite technology, computers, and the like presage a veritable revolution in understanding, manipulation, and rehabilitation of the oceans and the atmosphere, your mission. Yet, NOAA seems to be retreating from its mandate rather than pursuing these exciting and incredibly potentially productive frontiers while, as I say, almost at the very moment while our high technology capabilities give you the strength and the capability that NOAA has never had before to pursue its mission.

I am talking about such things as seafloor spreading research. I am talking about such things as land remote-sensing satellites and ocean remote-sensing satellites which enables you to do a far better job at predicting and transferring knowledge about changes in land conditions, weather conditions, crop conditions, blight conditions, drought conditions, all kinds of conditions of the oceans at very much less cost than we are presently doing it and in a far more technology intensive way, a vast savings of labor.

So we find this perplexing. We hope you will be able to assure us, hopefully, that it ain't so, but if it is so, that it is going to change.

Today's hearing will address much of the NOAA budget, including the National Weather Service and the oceanic and atmospheric research. We have delayed this hearing several times to give you time to formulate new policies concerning satellite systems. So we will refrain from considering the satellite programs this morning, for the time being that is, but we will ask you to come back before the subcommittee just as soon as you complete your plans. We hope this will be very soon, because we are concerned about the Administration's seemingly haphazard decisionmaking process with respect to NOAA's satellite programs.

Just 6 months ago, the Department of Commerce signed a contract with the Earth Observation Satellite Corp., Eosat, to continue a U.S. presence in land remote sensing. In January, I understand that NOAA proposed to renege on this contract. Now, we understand that NOAA is trying to save Landsat and the second polar satellite along with it with a proposal to create a commercial space platform known as Omnistar.

Now, we do support your efforts to find creative solutions to the satellite issues. If several missions can be combined in one satellite or in one commercial space platform so that we can be more effective, if we can have a multidisciplinary, multimission capability up there, obviously we would applaud that. But we are concerned at the possibility that Omnistar is going to give OMB yet another excuse to delay and ultimately perhaps to terminate NOAA's satellite program. We are very concerned about this.

So, we urge you to use your best efforts to bring this proposal, bring your plans to completion, to fruition, and bring this proposal forward for our consideration at the earliest possible date.

We are very concerned for a delay of even months in our satellite program because we are in a perfectly clear international competitive race. The French launched a satellite just a month ago called SPOT. Now, OMB might well say "Out, out damned SPOT," but that would be of little avail, because wishing will not remove it. It is there, and we have to face the fact that it is operating, that it is a competitive presence. The Japanese will be up there in the

next couple of years. If we sit in the wings and let the action in the center stage take place without our presence there, we are going to be in a competitive disadvantageous situation for many years to come.

It will be a self-fulfilling prophesy of failure to delay now at this critical point where many nations, several nations, are entering the whole satellite technology and information distribution business.

We know that getting there firstest with the mostest, so to speak, can be a self-fulfilling prophesy of success, and this has been the American genius. We were first with automobiles. We were first with a lot of things. And we were virtually unrivaled around the world for generations in new technologies which we pioneered.

But of recent date, we have seen a very troublesome phenomenon of the process of our developing technologies which, somehow or another, we never commercialize and we never brought to fruition. We did the research by corporations, presumably where the research and development was a deductible item on their tax forms. So, the taxpayers paid for 50 percent of the research. But lo and behold, other nations soon started competing with us and outcompeting with us, whipping us in international competition and global competition with the very technologies that we had developed, but we were soon lagging in.

This is something that troubles us very deeply. We want to be first in space, and we want to be first in the commercialization of satellite technology. We are very concerned that we are on the knife edge of losing a desperate competitive struggle. So, we hope you will have something to tell us about your plans.

We now have Congressman Paul Henry of Michigan, and I am happy to yield to him to give any views that he has as the ranking minority member present.

Mr. HENRY. Thank you, Mr. Chairman.

I apologize, first of all. I have a markup in my other committee with four bills coming up right now, so I am going to have to excuse myself. But I wanted to be here especially, Mr. Chairman and Dr. Calio, to express my concerns in the budget proposals, particularly as they will affect Great Lakes environmental research and the Sea Laboratory Program, the Sea Grant Program.

I note that in the explanatory materials that are submitted with the budget by the Administration that there is what I believe to be a very mistaken notion that the Sea Grant Program is really one which benefits individual States and is not one of national significance or even international significance. This is really a critical issue for any number of reasons.

First of all, of course, all the Great Lakes but one are international waterways. It is an international program.

The pioneering research on relationship of ground water to fresh water is, I think, unrivaled and unsurpassed in terms of what that program is producing. There is tremendous technological research relative to ship design and commercial freight coming out of that program.

We also have a problem with record high water levels in the lakes, as you are aware, and tremendous problems of soil line erosion with tremendous economic consequences to the region, really

all-time record highs. Perhaps in some areas, the water is as high as it has been any time in the past 100 years, perhaps even longer, depending upon how you measure it.

I do have some written testimony we are working on that I will submit for the record for you and hope it will get some response. But I wanted to just express on that small portion of the parameters of your testimony this morning my concern and, quite frankly, I think the concern of people on both sides of the aisle from the region and also, I think, our insistence that this is not really a State grant program but a program which involves cooperative research with Canada, is involved in jurisdictional and treaty obligations with Canada relative to the agreements between the two nations and, likewise, particularly when you are dealing with the ground water-fresh water issue which is the environmental issue of the next decade, I am convinced, is some of our premier research.

I feel very strongly that some of the recommended cuts in this area are premature and improper.

Thank you, Mr. Chairman, just for letting me have the opportunity to say that word. Excuse me for going to my markup. I think you will understand my problem.

Mr. SCHEUER. Absolutely.

[The prepared opening statement of Mr. Henry follows:]

Rep. Paul B. Henry,
Opening remarks on NOAA reauthorization hearing.

Mr. Chairman, thank you for the opportunity to submit opening remarks at this hearing on the authorization of NOAA programs under the jurisdiction of the NRARE Subcommittee of the Science and Technology Committee. I also want to express my appreciation to Administrator Calio for coming before the subcommittee this morning to discuss the Administration's proposal.

At the outset, I want to acknowledge the very strict budgetary pressures all of us in the federal government face under the new Balanced Budget Act. In that regard, as a member of the Michigan congressional delegation, I want to note that NOAA has wisely proposed this year to maintain a core research program of $3 million for the Great Lakes Environmental Research Laboratory (GLERL).

I am not entirely pleased with the amount of funding proposed, for any reduction from current levels may impair some very important research projects at GLERL. I would appreciate some comments from Mr. Calio on that point, as the subcommittee will look very closely at any reductions in GLERL before approving a NOAA reauthorization.

I am also concerned over NOAA's proposal to eliminate funding for the National Sea Grant Program, and to rescind more than $30 million in FY 1986 in unobligated funds. Although the Sea Grant authorization is under the jurisdiction of the Merchant Marine and Fisheries Committee, the NOAA budget must of necessity be considered in its entirety, and acknowledgment made as to the interdependence of different program accounts. It is in this context that I make my comments.

The substantive intergovernmental considerations over the appropriateness of rescission requests, given the uncertain judicial situation of the legislative veto, and the serious policy considerations both need to be looked at very carefully in the Administration's Sea Grant rescission and funding request.

This member has serious concerns over the Administration's basic argument that that Sea Grant's goal to establish a network of institutions with expertise in aquatic research, education, and advisory programs has been reached, and that now state and local government can pick up the tab. Funding problems are not only being felt at the federal level, but also in many state budgets. As a former state legislator, I know the initial response of states to reduced federal funding for research programs such as Sea Grant is to lower, not to increase, the state commitment.

The argument that a few states, as opposed to the nation as a whole, are the prime beneficiaries of Sea Grant is not true. I do not need to remind Mr. Calio that all but one of the Great

Lakes are in fact international waters divided between the United States and Canada. To argue that research and other programs on these lakes are strictly of benefit to localities, to a few states, or even to the United States alone, is to ignore both geography and the many cooperative efforts we have undertaken with the Canadians in the Great Lakes area.

In fact, Sea Grant has a strong record of innovative contributions to the well-being of the marine sector and continues to be a high-yield investment for the United States. Its pioneering concept of industry/university/government partnership is one which should be maintained and serve as a model in this time of tight fiscal restraint and increasing focus on economic growth and development.

The accomplishments of Sea Grant research are well-documented. At this time I would like to mention only a few projects of immediate importance to the Great Lakes region.

The record high water levels have caused severe economic and other dislocation along the Great Lakes shoreline. The results of Sea Grant research are now being provided to shoreline property owners to help them avoid further erosion damage. In four months, 3,000 people have received erosion information from Sea Grant, and requests continue. These efforts are expected to reduce significantly the $300 million costs to residents--and governments--during the ongoing period of unusually high water levels.

The nation's commercial waters, including the Great Lakes as well as our ocean areas, continue to be an important national resource as well as a transportation route. In this area as well, Sea Grant projects have supported programs in the national, not merely parochial, interest. Sea Grant research has resulted in significant advancements in ship propulsion improvements, increasing ship energy and steering efficiencies. Sea Grant research has developed computer graphics programs to improve computer-aided design of ship hulls to improve capacity, maneuverability, and cost-effectiveness. Sea Grant research has also contributed to improvements in the safety of off-shore structures, such as oil drilling platforms.

These projects have been undertaken with strong private sector and university support, and seem clearly to be of benefit not to a few states or local governments, but actually to a much broader national and even international constituency. In that regard, I believe it is incumbent upon the Congress and the NOAA authorizing committees to examine very closely the Administration's request to terminate Sea Grant programs.

Thank you, Mr. Chairman.

Mr. SCHEUER. Now, I will take pleasure in yielding to the ranking minority member of this subcommittee, Congresswoman Claudine Schneider of Rhode Island.

Miss SCHNEIDER. Mr. Chairman, I would like to refrain from making any opening comments at this point in the interest of time, and I will be anxious to use my time after Mr. Calio has presented his testimony.

Mr. SCHEUER. Thank you.

OK, Dr. Calio, your full prepared testimony will be printed in full at this point in the record. So, we suggest that you take 10 or 12 or 15 minutes or however much time you would like to summarize your testimony and refer to any remarks you may have heard that have triggered a little interest, and then after you finish, I am sure we will all have some questions.

STATEMENT OF DR. ANTHONY J. CALIO, ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE, ACCOMPANIED BY KATHLEEN CHARLES, DEPUTY DIRECTOR, BUDGET AND FINANCE, NOAA; RICHARD HALLGREN, ASSISTANT ADMINISTRATOR, NATIONAL WEATHER SERVICE; ALAN THOMAS, DEPUTY ASSISTANT ADMINISTRATOR, OCEANIC AND ATMOSPHERIC RESEARCH; AND WILLIAM BISHOP, ACTING ASSISTANT ADMINISTRATOR, SATELLITE AND INFORMATION SERVICES

Dr. CALIO. Thank you, Mr. Chairman and members of the subcommittee.

I am delighted to be able to be here today as the Department of Commerce's representative to talk about our atmospheric and oceanic programs in support of the President's budget submission for fiscal year 1987.

I appreciate the comments that you made in the early part of your statement. I will do my very best during my tenure to continue to build on the strengths and the individual capabilities within NOAA to continue to make it a strong science and service organization in the atmospheres and oceans. I feel we can do that within the present budget situation or budget climate that we are faced with in this Nation.

All of us within the Department take the deficit reduction targets very seriously. That puts a particular task on us managers to be able to extract the best efforts from our people, and our people are committed to our efforts and our programs as well as a commitment to manage within our dollar constraints. In some respects, it tests our skills constantly to be able to build a strong, and we need to build a stronger, NOAA while we stay within those constraints.

I think we can accomplish our objectives and our missions and be a strong agency, at the same time, fulfilling our obligation in meeting our particular deficit reduction targets.

Let me walk through, if I may, the major elements of NOAA to tell you where I think we are going, where we have the support of the administration, and we have your continued support, I believe, and where I see some of this ultimately leading to. Let me start with the Weather Service.

As you mentioned, the budget strongly supports the modernization of the National Weather Service. We have, in fiscal year 1987's budget request, $47 million to continue on with the Nexrad development.

The Nexrad is well along its way. We are in the test and evaluation phase this summer. We hope by the end of the year and the beginning of next to be able to go into the first production buy with those doppler radars which will be a tremendous asset to the weather forecasters in enabling them to be able to predict the onset of severe storms and rain.

As you know, we have requested in that Nexrad proposal that the $47 million come from the Airport and Airway Trust Fund. That has been brought before the FAA and, to the best of my knowledge, there has been no objection from the FAA for that source of funding.

We are continuing to test and develop automated systems observation systems in Kansas City. That program is intact and on schedule, and the budget request in fiscal 1987 continues on with that program.

The third part that ties it together, the advanced weather interactor processing system, a budget request for $9.7 million is in fiscal year 1987 to be able to define, design, and lead toward a prototype assessment for the advanced weather information processing system.

So, the major elements for modernizing the Weather Service are in place, are requested in this budget, that will help us to be able to increase our skills in weather forecasting.

Along with that, this summer, the head of the Weather Service and myself and some outside consultants will be working on a restructuring plan of how we can build and restructure a new Weather Service using these new technologies. We plan to have that restructuring plan before the Department the middle of this summer and to the OMB so that in fiscal year 1988 you can see the effect of our studies to be able to carry out a strong, meaningful weather program using modern technology in a cost effective and efficient way.

Along with that, we are requesting the continuation of the PROFS. That is essentially the modern test bed in Boulder, CO, where we developed the appropriate software to be able to use this technology. We are requesting to continue to fund that in fiscal year 1987.

At the same time, we are trying to accelerate our efforts to implement the hurricane prediction system.

So, when I look at all the bits and pieces that are necessary to build a strong, modern National Weather Service, they are there, they are in our budget, they are requested, and we think we are responding to our mission requirements in that arena.

Because I am talking about the atmosphere, let me slide in quickly and talk about the atmospheric research activities. We are carrying out, even though we have had a reduction in our R&D budget, the three important elements in atmospheric research the National Academy has suggested we carry out. That is mesoscale weather research, atmospheric chemistry, and interannual climate variability.

We think that we are carrying them out at the appropriate level for the agency. We have some of the best, if not the best, scientists in the world carrying out that research and interacting in a very effective way with our sister agencies in the National Science Foundation and with the National Aeronautics and Space Administration.

We are requesting in this budget the continuation of that activity. We are requesting $4.7 million in mesoscale research. We are requesting the continuation of funding the wind profiler. As you know, we have that profiler going into a test phase. We have a purchase request for 30 profilers to be developed to go into a test pattern program to evaluate the use of those profilers to measure upper air winds in 1988 in the central United States. So, this budget supports that advancement in research and that advancement in the use of U.S. technology and the advancement for the future of the Weather Service.

We are continuing our efforts in atmospheric chemistry and working very closely with EPA, the Department of Energy, Agriculture, and the like in supporting the National Acid Precipitation Assessment Program. We are an active and a vital participant in that. I am a member of the joint chairs with Lee Thomas from EPA and other members of the executive branch. Our people are intimately involved in the conduct of that program and the important research of understanding atmospheric processes and sources and sinks of atmospheric constituents.

We are expanding that program to look at radiatively important trace species with our research in Boulder, and we requested an increase of $1.5 million.

On the third element, climate variability, we have a very strong research effort. We, as you know, initiated TOGA, the tropical ocean global atmosphere experiment, in January a year ago. This January, I had the pleasure to participate with the People's Republic of China on the first international major cooperative effort where the Chinese have, actually working with us, vessels cruising the South Pacific with American scientists on board and with American instrumentation on board, contributing in an active way to the tropical ocean global atmosphere experiment.

In total, we have about $20 million in climate research and $2.5 of that in the TOGA Program.

So, our research efforts are fairly strong and are supporting the National Academy recommendations.

Let me close my comments by talking about satellites and information systems. I guess I react a little bit to the haphazard way we are approaching the satellite business. I am always very sensitive because of my background of people accusing me of putting too much attention on satellites in this atmospheric and ocean agency, but I want to hasten to add that I think we are moving along in a very responsible way.

This year, we just signed a contract with Ford Aerospace to buy five new geostationary environmental satellites at the savings, over the lifetime of the program, of $100 million. Because we were able to place that order in December, with the approval of Congress to

be able to buy those five satellites, just in the signing of the contract,[1] we saved $5 million.

So, we are saving money. At the same time, I think we have provided stability in the Geostationary Satellite Program through the 1990's so that we have two currently being built and the new order for five, which is probably one of the strongest positions the Geostationary Satellite Program has ever been in in years.

We plan to launch GOES-G the beginning of next month and hopefully solve the problem of only one single geostationary satellite coverage for the United States.

With respect to the polar orbiting satellite, in early June, we expect to launch NOAA-G. I believe it is a responsible position to take where we can indeed accept a cost reduction by accepting the risk of a one-polar orbiting satellite system. It is essentially a risk versus dollars exchange, and from my assessment, with due respect to the GAO report, my feeling is that the exposure we have with a one-polar system in the case of a total failure is probably in the order of about 4 months, not the 1 year quoted in the GAO report.

So, my reaction is that I strongly support what makes sense in reducing cost by going to a one-polar system and putting us in a strong polar orbiting situation.

As you know, we are cross strapped in information systems with respect to the military satellite systems, even though the measurements are not exactly the same. We do support one another, and we would be able to straddle or get over any difficulty we might have should we have a 120-day period without any second polar orbiting satellite coverage.

With respect to Landsat, let me bring you up to speed on that.

Mr. SCHEUER. Excuse me, Dr. Calio—we are going to be informal, if you want, to interrupt—I am concerned about the possibility of even a 4-month lack.

Dr. CALIO. We face that right now, sir. We face that any time.

Mr. SCHEUER. You don't face it if you have a two satellite system.

Dr. CALIO. Well, let me tell you where we are right now.

Mr. SCHEUER. So, I am concerned about the danger of even a 4-month lapse, gap, blackout, put it however you will. With so many institutions and governments, especially in the developing world, urgently and eagerly and actively using that information that we give them on a daily basis, as well as our own multiple institutions in our country, a 4-month blackout would have devastating consequences.

And I would like to ask where you get the estimate of 4 months, because we have had repeated testimony before this subcommittee that the blackout would be a minimum of 12 months and more likely closer to 18 months.

Dr. CALIO. Sir, I don't know where you get those numbers, because the biggest problem that I see facing us is the 120-day callup period. We have to allow the launch people 120 days to be able to get a launch vehicle ready, to mate the satellite on the launch vehicle, and launch. They cannot launch one of our satellites—or the

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[1] Contract option was signed in December.

agreement is they will launch one of our satellites within 120 days of request.

Mr. SCHEUER. At any time?

Dr. CALIO. At any time. That is the way it is set up now. That is the 4 months I am talking about.

Mr. SCHEUER. Is that something new?

Dr. CALIO. No, we have had 120 days for how long?

Mr. SCHEUER. Because we have had repeated testimony that——

Mr. BISHOP. Ten years.

Dr. CALIO. Ten years, sir, we have had the 120-day call up.

Mr. SCHEUER. I wonder if you would be kind enough, and I would request you to supply this backup information for the committee, because we have had repeated testimony that the launching time would range from 1 year to 18 months and probably nearer to 18 months, and we will supply you with that testimony.

Dr. CALIO. Yes, sir, and I read the GAO report with alarm, because I don't know where those numbers come from of one year. As a matter of fact, we ran some 125 different scenarios of what could happen in a one- versus a two-polar orbiting satellite system, and only in one or two extreme cases would you ever get to one year. In the majority of the cases, it turns out to be 4 to 5 months.

Mr. SCHEUER. Maybe you could tell us what the cost to us would be and the cost to the various users, both domestic and international, of a blackout for even a 4-month period. I would think that would be something that would concern you.

Dr. CALIO. It does concern me, but I think that is a reasonable risk to take when we are talking about launching on 18-month centers and—let me see if I get the numbers right—we have launched 15. Two didn't get launched. Of the 13, only 2 were under 17 months. The design life is 2 years. We have launched 15. Two never made it to orbit. Of the 13 remaining, 2 failed at the 17-month time period. So, we are talking about launching every 18 months.

So, when I look at those numbers, launching every 18 months, the probability of having even a 4-month blackout is very small, and in the process, we can save about $150 million.[2]

Mr. SCHEUER. Do you plan to piggy-back on the shuttle launching program in the 1990's? I am not suggesting that is a bad idea, but I am convinced by recent tragic events—that we don't have to deal with here—indicate that these launch schedules are likely to be a very iffy matter.

Dr. CALIO. Up to the new buy which is the NOAA KLM which has not been purchased yet, the order has not been placed yet, mainly because we have been trying to resolve whether they should be launched on a shuttle or expendable launch vehicle, and there is a difference in cost between the two. It was not needed until 1991. So, with our current buy and a single polar system, we can fly on existing expendable launch vehicles through 1991.

If we go to a two-polar system, it is 1989.[3] That would be the point in time when we would need the new launch capability.

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[2] Dr. Calio wrote to the subcommitteee saying that the correct figure should be $60 million in fiscal year 1987.

[3] Dr. Calio wrote to the subcommittee saying the correct date should be 1990.

So, if we placed the buy or we placed the request proposals to buy the other three satellites, we would have a difficult time under a two-polar system of making that timeframe. Under a single polar system, we would make it, and I would think that the shuttle problems would well be resolved by the 1991 timeframe.

Mr. SCHEUER. Dr. Calio, I don't want to tie you up and interrupt the flow of your testimony——

Dr. CALIO. That is all right.

Mr. SCHEUER. So continue with your statement.

Dr. CALIO. Well, I was just about ready to wind it up. I was going to go from the polar orbiters now to Landsat and Eosat to address your Eosat question.

On March 18, we just modified the existing Eosat contract. As you know, they presented us a new notion——

Mr. SCHEUER. Excuse me. I really apologize for interrupting you again, but before we leave this question of the two-polar satellite system versus the one, let me recall for you that both the GAO and your own agency in the Envirosat 2000 study concluded that over the long run, a two-polar satellite system is very cost effective and that it costs less than $10 million a year more than a one-polar satellite system.

If you do a cost-benefit calculus on the benefits from this insurance policy that would ensure the users against that blackout, even if it is only a 4-month blackout, I think a reasonable person would say that just looking at the costs to the developing world countries of the vital information about what to plant, when to plant, when to irrigate, when to reap, when to sow, information that we give them about blight, about drought, about disease, animal disease, plant disease, all of that in terms of its value to countries that are on the brink of starvation, many of them in sub-Saharan Africa. We have seen these horrible television pictures on our screens that have galvanized the conscience of this country.

Admittedly, it is hard to crank that into a cost-benefit study helping these countries avoid starvation, but if you look at the benefit to the users just in sub-Saharan Africa of not having a 4-month blackout, I think you wouldn't have a great deal of difficulty coming to the conclusion that the $10 million a year extra cost of having the insurance of the two-polar satellite system is an investment that no prudent decisionmaker could afford not to make.

I don't want to dwell on that any longer, but——

Dr. CALIO. Well, may I accept that as a question from you, and I will personally provide you a written response of my analysis of that, taking into consideration the GAO report and Envirosat 2000.

Mr. SCHEUER. Yes. And give us, if you would for the record, whatever justification you have for this being a 4-month blackout and not a 1-year or 18-month blackout.

Dr. CALIO. Yes, sir. I will do that.

[Materials to be supplied follow:]

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

THE ADMINISTRATOR

NOV 18 '86

Honorable James H. Scheuer
Chairman, Subcommittee on
Natural Resources, Agriculture
Research and Environment
Committee on Science and Technology
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

I am pleased to respond to your question from the April 10, 1986, NOAA authorization hearing regarding the justification for the 120-day call-up capability for launch of NOAA polar-orbiting satellites.

The one-polar system proposed in the President's budget request to the Congress was developed to provide essential services to the user community while reducing the risk of service discontinuity to an absolute minimum. The plan recognizes that polar-orbiting satellites have been designed to operate in orbit for two years, but on average perform well for far longer periods. In choosing to launch replacement satellites on 18-month centers, we have planned conservatively, so that a new satellite will be in orbit and ready to enter service at the conclusion of the design lifetime of the satellite being replaced. Programmatic history has demonstrated that satellites, once past their infant mortality period, have a high probability of operational longevity well beyond their design life. It is this extended life which guards against service discontinuity from the time a replacement satellite fails to achieve orbit until a replacement is successfully orbited.

Our agreement with the U.S. Air Force signed in 1977 (copy enclosed) provides assurance of a 120-day call-up launch for polar satellites. The Air Force has also indicated that the same service would be provided for future launch services (copy of USAF letter enclosed). The GAO report is accurate

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in pointing out two instances where the USAF was unable to provide a 120-day call-up. In considering the circumstances associated with these instances, however, it must be recognized that at the times in question, NOAA had a fully operational satellite in orbit, which met the primary requirements of our users, as confirmed by the same GAO analysis. NOAA managers did not feel compelled to request priority consideration by the USAF when in-orbit resources were operating well and service continuity did not appear to be threatened. They also considered that procurement of the NOAA K/L/M satellites had been delayed, and recognized that the launch delays would aid in bridging the out-year period, before NOAA K could be delivered. It was recognized that USAF national security requirements prevailed; we did not challenge them. I feel certain that we would have received a high launch priority had a service outage threatened. It is reasonable to assume, therefore, that a launch or premature satellite failure that resulted in, or threatened, a data discontinuity would be recognized as an emergency situation. I firmly believe that a launch would be arranged within the 120-day vehicle preparation constraint or as soon as the mechanism causing the previous failure could be determined and rectified.

If there were to be a gap, I believe the gap would be closer to four months than to twelve and that in-orbit resources would maintain at least some capability during this period. I am convinced that the risk associated with this approach is small and programmatically acceptable considering the projected cost savings as defined in the President's budget request.

Sincerely,

Tony

Anthony J. Calio

Enclosures

Amended March 77

USAF/NASA MEMORANDUM OF AGREEMENT

ATLAS-E/F LAUNCH SUPPORT FOR

TIROS-N AND SUBSEQUENT NOAA MISSIONS AND THE SEASAT-A MISSION

1.0 PURPOSE: This agreement defines responsibilities, policies and operating principles that will govern the relationships between USAF and NASA relevant to use of ATLAS-E/F launch vehicles in support of TIROS-N, follow-on NOAA missions and the SEASAT-A mission. This agreement is intended to be used as a basis for implementing agreements to be arrived at by field organizations of both agencies directly concerned with particular aspects of these efforts.

2.0 DEFINITIONS:

2.1 LAUNCH VEHICLE SYSTEMS

2.1.1 The launch vehicle system for TIROS N and subsequent NOAA missions consists of the ATLAS-E/F launch vehicle booster, payload conical adapter, aft adapter, fairing adapter, 84 inch diameter fairing, launch site, and AGE.

2.1.2 The launch vehicle system for SEASAT-A consists of a modified ATLAS-F launch vehicle booster, interstage adapter, 120 inch diameter fairing, launch site, and AGE.

2.2 SPACECRAFT SYSTEMS

2.2.1 The spacecraft system for TIROS-N and subsequent NOAA missions consists of the TIROS-N/NOAA spacecraft, the spacecraft-to-launch vehicle adapter, separation system, and associated spacecraft AGE.

2.2.2 The SEASAT-A spacecraft system consists of the Agena bus, sensor module, the spacecraft-to-launch vehicle adapter, separation system, and associated spacecraft AGE.

3.0 BACKGROUND:

3.1 For TIROS-N and subsequent NOAA missions, NASA/GSFC has been assigned responsibility for overall project management including launch vehicle interface, launch operations, and associate program activities. NASA/JPL has been assigned the same responsibility for SEASAT-A, except NASA/LeRC is assigned the NASA technical and fiscal responsibility for the SEASAT-A launch vehicle system and its integration with the spacecraft system. KSC will support these projects at SAMTEC in the areas of launch vehicle modification, refurbishment, and launch operations. Specific responsibilities will be outlined in working level agreements between the NASA field organizations (GSFC TIROS-N Project Office and for SEASAT-A the JPL SEASAT-A Project Office and/or NASA/LeRC LVD) and SAMSO.

3.2 USAF/SAMSO has been assigned the responsibility for the management, adaptation, and refurbishment of the launch vehicle system (Except as noted in paragraph 5.0). Launch responsibility for the ATLAS-E/F vehicles at the SAMTEC has been assigned to the 6595th Aerospace Test Wing.

4.0 GENERAL POLICY AND PRINCIPLES: Effective and efficient use of ATLAS-E/F vehicles, facilities, and services provided by the USAF for launch of these missions requires an environment of understanding and cooperation between the two agencies. To this end, the following principles shall govern the relationship between the two agencies:

4.1 There shall be maintained a free and effective interchange of technical, financial, and managerial information between the two agencies. Requests for information about matters on contract will be obtained through the appropriate government contract agency.

(A) The NASA field organizations and the SAMSO Medium Launch Vehicle Division (L .(M) shall establish the necessary coordination to insure the proper integration of the vehicle system in the overall project. Coordination shall be established as necessary to conduct all mission and launch vehicle system interface and associated program activities including configuration control board activities for both the launch vehicle and spacecraft systems.

(B) Appropriate requested data and documentation relevant to the design, qualification status, reliability, quality assurance, flight performance, testing history, etc., of the launch vehicle and spacecraft systems shall be exchanged.

4.2 The USAF will provide a launch vehicle system for SEASAT-A (except as noted in paragraph 5.0) and at least seven launch vehicle systems for TIROS-N/NOAA along with the necessary manpower, scheduling, and facilities to assure a 120 day call-up capability for NOAA-B and subsequent missions and to assure 2nd quarter CY 78 launch dates for SEASAT-A and TIROS-N and a 3rd quarter launch date for NOAA-A. If priority conflicts occur between USAF and NASA, the signers of this agreement will be notified for resolution. NASA Headquarters will resolve conflicts between NASA missions.

4.3 In order that the NASA may be technically satisfied with the product or services provided by the Air Force, the following principles shall apply to NASA missions:

(A) NASA field organizations will call for the USAF to conduct formal program reviews of the mission subsystems, including the launch vehicle systems. USAF/SAMSO launch vehicle systems manager and/or its contractors will support such program reviews.

(B) NASA field organizations will be provided by SAMSO, upon request, with access to appropriate hardware history data, such as manufacturing history, test data, etc.

(C) NASA/Field organizations will be invited to the launch vehicle system design reviews, acceptance test reviews, witness all refurbishment tests, and modifications testing conducted by the USAF or the launch vehicle contractor.

4.4 None of the above principles shall be construed as to give to NASA the basic responsibility for the launch vehicle system. (except as noted in paragraph 5.0).

4.5 To obtain the necessary assurance that the spacecraft systemsand the SEASAT-A fairing will not unfavorably affect the performance or integrity of the launch vehicle system, USAF/SAMSO representatives will be requested to participate in technical reviews and witness tests when it pertains to the spacecraft/fairing/launch vehicle interface. NASA will provide appropriate technical data to SAMSO when it pertains to launch vehicle/fairing/spacecraft integration activities.

4.6 NASA/field organizations will provide documented mission and spacecraft requirements which are to be met by the launch vehicle system. This documentation will be maintained on a current basis, so that it may be used for defining launch vehicle system/spacecraft system integration requirements and for implementing mission-peculiar software to satisfy the NASA mission.

5.0 PROCEDURES AND POLICIES FOR THE LAUNCH VEHICLE SYSTEMS

USAF/SAMSO has the responsibility for management of the launch vehicle system and launch operations; except that NASA/LERC is responsible for management, adaptation and refurbishment of the SEASAT-A 120 inch diameter fairing system and associated AGE. This includes providing the following in response to NASA mission requirements:

5.1 Launch Vehicle System: The USAF has responsibility for the design, engineering, procurement, production, acceptance, and configuration control of the launch vehicle system, except that NASA/LERC has these responsibilities for the SEASAT-A fairing system and its associated AGE. The launch vehicle system will be modified as feasible in response to NASA mission requirements.

5.2 Spacecraft/Launch Vehicle Systems Integration: The integration of these systems will be conducted in accordance with existing ATLAS-E/F procedures as modified by the NASA field organization and SAMSO, and based on criteria jointly developed and agreed to by the NASA field organization and SAMSO. Each agency shall incorporate the agreed upon criteria into their respective systems. Memorandums of Understanding specifying functions and procedures shall be prepared.

5.3 Launch Facilities and AGE: The USAF has responsibility for all ATLAS-E/F facilities and equipment which are required to support the launch of the missions at the SAMTEC. Installation of mission peculiar AGE, including clean room, or spacecraft AGE will be accomplished under the mangement of SAMSO in accordance with mission requirements.

5.4 Launch Operations: The SAMSO will serve as the launch operations systems manager for the launch vehicle system operations and range support operations, responsible to the appropriate NASA Project Manager for the mission's launch and range support requirements.

6.0 FINANCIAL:

6.1 USAF/SAMSO will identify to the appropriate NASA organization all funding

required on an additive cost basis, by fiscal year, for the procurement, support, and associated services furnished by the USAF/SAMSO under the terms of this agreement.

6.2 The funding requested will be that required by the USAF for the net costs of missions or vehicles requested. In general, these costs will be comprised of the costs for studies, hardware (including mission peculiars, the refurbishment support and refurbishment test propellants), plus additive costs accrued for launch and other support if the additional launch or launches requested result in a launch rate in excess of the established capability. Any other mission peculiar costs such as modifications of AGE or facilities will also be charged.

6.3 The required funds will be provided to the USAF/SAMSO by NASA on an incremental basis consistent with USAF/SAMSO scheduled procurement requirements.

6.4 Funding requirements will be described in sufficient detail to establish elements of cost for the equipment and services provided.

6.5 USAF/SAMSO will provide periodic financial reports to the appropriate NASA field installation. Updated budgetary estimates and supporting data will be provided to coincide with the NASA budget formulation requirements presuming necessary definition data is available from NASA.

7.0 EFFECTIVITY:

7.1 This agreement is effective on the date of the signatures below.

8.0 AMENDMENTS:

8.1 Amendments or revisions to this Memorandum of Agreement can be made by mutual consent of the signatories.

John Martin

Dr. John J. Martin
Assistant Secretary of
Air Force
Research and Development
Department of the Air Force

Date: 3 May 1977

John F Yardley

John F. Yardley
Associate Administrator
for Space Flight
National Aeronautics and
Space Administration

Date: 8 April 1977

Amended March 77

DEPARTMENT OF THE AIR FORCE
WASHINGTON, D.C. 20330-1000

#29989

OFFICE OF THE UNDER SECRETARY

January 15, 1986

Honorable Anthony J. Calio
Administrator, National Oceanic and
Atmospheric Administration
Washington, DC 20230

Dear Mr. Calio:

Thank you for your recent letter regarding NOAA's potential use of Titan IIs for NOAA K, L and M satellites. As you are aware, this program had some opposition in the Fiscal 1986 budget debate in Congress. Although the program has been approved, restrictive language has been applied to potential uses of the boosters.

Since the Titan II conversion contract was not awarded in October as we had planned, and additional budget restructure may be required, we cannot fully assess program costs at this time. I expect to have these cost figures better defined after program certification for the Defense Meteorological Satellite Program to Congress and negotiation of the contractor's proposal for booster conversion and launch. These costs should be available in early February.

If OMB and Congress approve Titan II as the best option for NOAA, we would be willing to launch the K, L and M satellites. We could provide a 120 day call-up capability, subject to the same restrictions that currently exist for your Atlas launches. In particular, high priority Defense Department launches would have precedence in launch conflict situations.

Sincerely,

E. C. ALDRIDGE, JR.

Mr. SCHEUER. Please complete your statement.

Dr. CALIO. Let me finish off with Omnistar. On March 18, we signed a contract change with Eosat after an exhaustive study on our part of the proposal that was submitted last winter by Eosat to look at a new spacecraft called Omnistar to replace the existing TIROS-N design. The results of that engineering assessment was there is not much greater risk by taking that change and the costs were the same and the opportunities were much greater using that space serviceable platform than using the TIROS-N.

We accepted that change on March 18. As you know, we are in the process of looking at ways in which we might be able to merge our polar orbiting capability. That proposal has been worked to some extent with Eosat, has been submitted to the Department, and I believe today will be submitted to OMB. So, I am looking forward to be able to discuss that one way or another with you in the next couple of weeks.

Mr. SCHEUER. Excellent.

Dr. CALIO. Let me stop there, Mr. Chairman. That gives you sort of an overview of our research and development activities to some extent. I was a little short on that, but our satellites and Weather Service.

I guess there is one more point I would like to bring up, and that is from the service aspect.

Mr. SCHEUER. From what aspect?

Dr. CALIO. From our service aspect. I look at us as a science and service agency sort of working in the third dimension. Our job is to try to understand the phenomena that are occurring in the atmosphere and the oceans and to be able to provide valuable and timely forecasts of what is happening there.

In that light, we are a vital source, and this comes to the question of our mission, of environmental information for industry and academia and other Federal agencies. At the present time, we are looking at ways in which we can improve our information collection, integration, and dissemination in a way that we can effectively serve the scientific and industrial communities and the Government agencies and yet in a way that would not cost us any appreciable money as far as the general taxpayer is concerned.

So, we are in the process of doing that. Hopefully, in the next fiscal year, we may be able to bring those plans forward.

[The prepared statement of Dr. Calio follows:]

ANTHONY J. CALIO
ADMINISTRATOR
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

before the

SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURAL RESEARCH AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
UNITED STATES HOUSE OF REPRESENTATIVES

April 10, 1986

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to discuss with you the National Oceanic and Atmospheric Administration's (NOAA) programs and policies.

My testimony will highlight major activities of the National Weather Service, the Office of Oceanic and Atmospheric Research, and the National Environmental Satellite, Data and Information Service and certain National Ocean Service programs based on our FY 1987 budget submission. The FY 86 currently available figures shown in the FY 87 budget request do not reflect the 4.3% reduction as a result of the Gramm/Rudman/Hollings sequestration. However, this does not affect the figures for FY 87 because the FY 87 request is within the deficit reduction required under Gramm/Rudman/Hollings.

The National Weather Service

NOAA's FY 1987 budget proposes full funding for the development and acquisition of the Next Generation Radar (NEXRAD) and development of two major systems for the National Weather Service (NWS).

These systems collectively will enable us to modernize the weather service with the latest technology and science to improve our severe weather and flood warnings and forecasts.

Major system upgrades planned over the next decade include Automated Surface Observing Systems (ASOS) to reduce time-consuming manual observations; Next Generation Weather Radar (NEXRAD) with doppler capability and sophisticated software to provide nationwide coverage for timely, accurate detection of severe storms and floods; and an Advanced Weather Interactive Processing System (AWIPS) to integrate, process, and transmit high-volume radar, satellite, upper air, and surface observation data.

The basis of our local warning program is the weather radar. We remain committed to replacing the existing obsolete weather radars with an effective, modern system which will serve the Nation well into the next century. NEXRAD is a joint FAA/DOC/DOD effort to develop an advanced doppler radar system. Our FY 1987 budget requests financing of $47.5 million, from the FAA-administered Airport and Airway Trust Fund, because aviation is the major beneficiary of the program and the FAA determines the programs' technical specifications and siting requirements. The deployment of NEXRAD units will begin in FY 89. The Validation Phase will be completed by the end of this year and a production contractor selected.

In the last few years we have witnessed an exciting series of developments in our ability to forecast small-scale weather phenomena. At the National Severe Storms Forecast Center (NSSFC), we have used a pilot computer-based system which permits forecasters to integrate radar, satellite, and other meteorological data when making forecasts.

The Program for Regional Observing and Forecasting Services (PROFS) system, developed at the Environmental Research Laboratories, applies interactive computer procedures to improve our short-range severe weather warnings and alerts.

To make the features of the PROFS computer system available to NWS field offices, our FY 1987 budget requests $9.7 million to continue competitive system design and communications upgrade activities associated with deployment of the Advanced Weather Interactive Processing System (AWIPS) in FY 1990 through 1994. The AWIPS system, which will replace the existing AFOS system, will improve the communication and processing of observational data and forecasting products. AWIPS will increase our ability to provide better warnings and improved forecasting of small scale severe (mesoscale) weather events such as thunderstorms or tornados. It will also provide the capacity for transmitting and fully utilizing larger and more frequent observational data.

The President's FY 1987 budget request supports the basic mission of NOAA to provide essential forecasts, warnings, and advisories for the protection of life and property and to promote economic development by supplying other government agencies and industry with timely weather and climate services. We propose to decrease or eliminate funding for programs which are no longer necessary, which are low priority, or which are not Federal responsibilities including Landsat subsidies and the Second Polar Weather Satellite.

To reduce overhead, our FY 1987 budget proposes both, the consolidation of the Pacific and Alaska Weather Service regional offices and the closing of the Southern Regional NWS Headquarters, transferring its responsibilities to the Eastern and Central Regional headquarters. These offices provide field managerial support but have no forecasting or data gathering responsibilities. Staff reductions in the FY 1987 budget will result in a more efficient staff structure without detriment to service delivery. Also, we are seeking to discontinue FY 1986 budget add-ons for the Susquehanna River Basin Flood Warning System, the Colorado River Basin Flood Warning System, as well as the prior year add-on for the NOAA Weather Radio emergency power program because those projects have been completed.

Providing specialized weather services for specific user groups is not a Federal responsibility. Some agricultural, fruit frost, and some fire weather services are discontinued in our FY 1987 budget. While continuing to provide fire weather services for Federal forest lands, we will eliminate non-wildfire support to non-Federal agencies. General public forecasts will be available to non-Federal entities; specialized forecasts should be provided to industry by private meteorological firms. Our goal is to devote resources to improving our ability to get fast, accurate weather warnings and alerts to the general public.

Oceanic and Atmospheric Research

NOAA's Office of Oceanic and Atmospheric Research conducts research and development to improve NOAA services and resource management. This research is used by NOAA components, other Federal agencies, the private sector, and for atmospheric, marine and space research. OAR's research programs are diversified; for example, technology development to improve prediction of meteorological and climatic conditions; and investigations of the fundamental physical and chemical properties of the atmosphere, hydrosphere, and solar-terrestrial environments.

NOAA's FY 1987 budget requests enhancements to accelerate three atmospheric research programs — hurricane prediction research (+ $1.0 million), a temperature/ humidity profiler (+ $0.5 million) and the Radiatively Important Trace Species (RITS) program (+ $1.0 million).

NOAA's Atlantic Oceanographic and Meteorological Laboratory and Geophysical Fluid Dynamics Laboratory in collaboration with our National Meteorological Center and National Hurricane Center, will take advantage of recent advances in hurricane modeling, computing power, and data collection techniques, to refine and implement a second-generation hurricane prediction system.

OAR's Wave Propagation Laboratory (WPL) has begun a program to develop, procure, and deploy an experimental Doppler radar system called PROFILER. The PROFILER system is for remote measurement of wind profiles. This year we will procure 30 wind PROFILERS for use in a demonstration project.

In FY 1987 we propose to begin developing the complementary thermodynamic profiler system which is a passive microwave system for measuring temperature and humidity profiles. A combined wind/thermodynamic profiling system, when developed fully, has the potential for replacing the current radiosonde system at a lower operating cost and with far more frequent observations.

The RITS program, which started in FY 1985, will test the theory that increases of certain atmospheric trace gases and aerosols (nitrous oxides, methane, chlorofluoro-carbons and tropospheric ozone) contribute as much to the warming of the earth's atmosphere as increases in carbon dioxide. The so-called "greenhouse effect" which results from atmosphere warming, in the long term, could cause significant global climatic changes affecting rainfall and food production patterns.

We are seeking the same level of funding in FY 1987 for NOAA's participation in the National Acid Precipitation Assessment Program as in FYs 1985 and 1986 ($4.4 million). We are developing techniques to measure dry deposition of acidic materials and continuing research on the source, extent and transport of wet and dry acidic materials.

In FY 1987 NOAA will continue its research into global climate variability related to El Nino. This research is now conducted by several nations under an international program called the Tropical Ocean Global Atmosphere (TOGA) program. NOAA is the lead U.S. TOGA participant. This program shows

great promise in predicting year-to-year climate variations. Recent models have simulated oceanic conditions in the equatorial Pacific during several past events, including the 1982-83 El Nino. One aim of the program is to adapt one such model for operational use in 1986.

Understanding the ocean's role in climate variability over longer periods is the goal of the Subtropical Atlantic Climate Studies (STACS) program. It develops techniques to monitor the processes by which the North Atlantic Ocean transports excess solar heat poleward from equatorial regions. After successfully developing an electromagnetic technique to monitor the Gulf Stream off Florida, STACS will extend its investigation to the Caribbean Sea and Windward Passage to determine the variability and magnitude of the Florida Current's heat transport role and variability.

Our FY 1987 budget will support NOAA's Space Environmental Laboratory to provide solar-terrestrial data and forecasts for government, industry and foreign governments 24 hours-a-day/7 days-a-week. This information is vital for communications and air and space travel which can be disrupted by magnetic or particle storms caused by solar flares. The budget will also enable the Space Environmental Lab to continue a core program of applied research to improve forecasting techniques.

Our FY 1987 budget will also maintain a core research program ($3.0 million) at the Great Lakes Environmental Research Laboratory (GLERL). The focus will be on research activities that are clearly Federal responsibilities (for instance, support for the U.S.-Canada Water Quality Agreement).

In FY 1986, NOAA began a Fisheries Oceanography Coordinated Investigations (FOCI) initiative to understand and predict the effects of environmental changes on major U.S. fishery resources. This is a multi-disciplinary research effort conducted on a large spawning area of pollock recently discovered in Alaska's Shelikoff Strait. We believe that we can achieve savings of $1.0 million by deferring certain elements of this laboratory and field research program. The remaining $2 million core program will meet the long-range goals of the FOCI program.

One objective of NOAA's research on marine warning and forecasting is to develop advanced sea ice forecasts as an aid to fisheries and navigation. In cooperation with the Office of Naval Research, NASA and the Coast Guard, NOAA has completed a study of sea ice drift and ice edge behavior in the Bering Sea. NOAA will begin work in the Chukchi Sea in FY 1987.

We continue to believe that savings can be achieved in some OAR programs by: 1) eliminating general taxpayer support for programs which primarily benefit state, local or private sector interests; and 2) focusing limited resources on the highest priority research and development activities in support of NOAA missions. The former category includes funding for the National Sea Grant College Program, the National Undersea Research Program and the State/Federal Weather Modification Grant Program which we believe should be fully supported by non-Federal public and private sources.

Recognizing the need to provide support for the highest priority NOAA research missions, the FY 1987 budget proposes to:

- defer additional research on the physical, chemical, geological and biological processes at seafloor spreading centers ($1,800k),
- reduce funding for PROFS that is not needed to support the National Weather Services AWIPS-90 program ($2,000k); and,
- postpone the acceleration of the program on severe mesoscale convective precipitation systems until new observing and data processing capabilities (such as PROFILER, NEXRAD and AWIPS) are in place ($2,500k).

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National Environmental Satellite, Data and Information Service

Budget items of the National Environmental Satellite, Data and Information Service of interest to the Subcommittee include the procurement and operation of polar and geostationary weather satellites, and the acquisition, archiving and dissemination of environmental data and information.

In FY 1987 we are proposing a net decrease in funding of approximately $72 million. Most of the decrease reflects savings associated with conversion to a single polar-orbiting satellite from the two-satellite system. Following the launch of NOAA-G, the one-polar system should maintain two operational SARSATS through 1990, no significant degradation in the quality of weather forecasts from operating a one instead of two-polar system is anticipated. The improvements in the GOES satellites will supplement the one-polar satellite over the western hemisphere. Also, soundings are available from defense polar satellites. The decrease in the geostationary satellite program reflects normal phasing of funding in spacecraft procurements.

We are proposing an initiative to establish a U.S. Mission Control Operations Center for satellite search and rescue operations. For this initiative, an increase of $3.78 million is requested to establish the ground processing system needed to receive, process, and disseminate emergency alert and location

data for the COSPAS/SARSAT program -- an international cooperative effort that uses Soviet and U.S. environmental satellites to detect and locate pilots and mariners in distress. The U.S. Mission Control Operations Center will be the regional alert and distribution center for both North and South America.

In our request, funds for polar spacecraft procurement and launch have been decreased by $62.23 million. The remaining funds will provide for the procurement of spacecraft and launching services needed for the conversion from the current two-satellite system to a one-satellite system. Conversion will take place when the NOAA-G satellite, planned for launch in 1986, fails (probably some time in 1988).

We are requesting an increase of $3.05 million for polar satellite ground systems. These funds are needed in FY 1987 to refurbish and upgrade current ground system components and to add additional components that will be required by follow-on polar-orbiting satellites. These improvements are mandated by changes in the sensing instruments and communications characteristics of the modified NOAA-J and the follow-on NOAA K, L, and M spacecraft. The upgraded ground system changes must be in place by FY 1990 to support the planned launch of NOAA-J.

A net decrease of $25.45 million requested in funding for geostationary spacecraft procurement and launching. This decrease reflects completion of funding (-$43.4 million) for GOES-G and H with the launch of these two spacecraft in FY 1986. The decrease is partially offset by planned increased funding to procure GOES I-M spacecraft and associated launch services.

A net increase of $12.64 million is requested to support the geostationary satellite ground system. A planned increase of $14 million is requested for the GOES-NEXT ground system, to continue efforts initiated in FY 1986 to begin the transition to ground equipment and facilities to the configuration required by the GOES-I through M satellite series. The new ground system will accommodate concurrent operations with two generations of GOES satellites and allow for expanded capabilities for both types of spacecraft. The above increase is offset by a planned decrease of $1.46 million associated with the near-completion of a multi-year GOES ground system modification that began in FY 1983. Remaining funds will allow completion of this effort in FY 1987.

A decrease of $1.4 million is requested for Landsat operations, reflecting a reduced level of services for FY 1987. No funds are requested to subsidize Landsat commercialization as this program principally benefits special interests and should be funded by those interests, not the Federal Government.

Funding for environmental data and information services will continue at approximately the FY 1986 level. In this program, NOAA provides global environmental data and information to commerce, industry, agriculture, science and engineering, the general public, and all levels of government.

National Ocean Service

Two programs in NOAA's National Ocean Service that are of interest to the subcommittee are: Marine Services, which provides the ship support for NOAA research, assessment, and survey activities; and, the Exclusive Economic Zone (EEZ) mapping and characterization efforts.

NOAA maintains a fleet of 23 ocean and coastal vessels to support its programs in nautical charting, fisheries research, resource and environmental assessment, and oceanographic and atmospheric research.

The NOAA Fleet is moving in new directions based on changing program requirements and new shipboard technologies. The need for shiptime on the larger, deep-ocean vessels (Class I) is increasing. NOAA, as well as the international community, is focusing on efforts to monitor and understand global air-sea interaction; to understand and model global ocean circulation patterns and to gather data on the bathymetry of the Exclusive Economic Zone. Program requirements are shifting from the east coast to the west coast, especially for nautical charting in "frontier" Alaska waters. NOAA is seeking to modernize the computers and equipment on the vessels. Single beam hydrography is being replaced by muti-beam swath survey systems; in the future single beam will be used only for surveying in previously unchartered Alaska waters.

In FY 1987, NOAA proposes to operate all four of the Class I vessels of the Fleet for the first time since 1982. A recently approved reprogramming has enabled the reactivation of the Class I deep ocean research vessel OCEANOGRAPHER to meet the growing need for days-at-sea on the larger vessels. The reprogramming includes deactivation of two Class III hydrographic/oceanographic vessels, the PEIRCE and WHITING. We plan to continue operating the OCEANOGRAPHER by keeping the PEIRCE in inactive status and reducing days-at-sea on Class II ships. Significant savings can still be achieved, consistent with the trends for the Fleet. For example, since studies have shown that field party launches are a more economical and efficient way to conduct hydrographic surveys in east coast and Great Lakes areas, we propose to deactivate a Class III and a Class IV vessel (McARTHUR and FERREL) which had been used for this work. We also propose to deactivate the WHITING. We propose to provide ship time for fisheries research by chartering commercial vessels, as this is less costly than maintaining the full fisheries fleet. This allows deactivation of eight fisheries vessels, ALBATROSS IV, OREGON II, DAVID STARR JORDAN, TOWNSEND CROMWELL, DELAWARE II, CHAPMAN, JOHN N. COBB, and MURRE II. The National Marine Fisheries Service may use some of the chartering funds to continue operating three of the NOAA vessels for some projects. The mix of charter and NOAA ship time will depend on which is most economical for a given project.

NOAA is requesting $47.5 million in funding for operations, maintenance, and support of the NOAA Fleet in FY 1987. NOAA proposed an increase to

purchase multi-beam bathymetric survey systems for two ships to meet the demand for deep water bathymetric information. NOAA is providing new tools, techniques and technologies needed to survey the Exclusive Economic Zone (EEZ), as discussed below.

NOAA and the U.S. Geological Survey (USGS) are conducting a cooperative program to produce detailed bathymetric maps of the 200-mile Exclusive Economic Zone (EEZ). Bathymetric maps are the basic tools for scientific, engineering, and marine environmenal studies of the seafloor. Detailed bathymetry off our shores will form the basis for private sector exploration and subsequent development of EEZ resources. Data on the configuration of the seafloor may also be an important component of accurate air-sea interactive models which could improve marine forecasts and warnings as well as the accuracy of 3-5 day forecasts over land.

NOAA's objective is to complete detailed bathymetric surveys of high priority areas of the EEZ. Areas off California will be surveyed first, followed by areas off Oregon, Washington, Alaska, Hawaii and the east coast. Two NOAA ships began bathymetric surveys along the west coast in FY 1984.

During FY 1985, a third ship will join the effort, and NOAA will survey over 10,000 square nautical miles of the west coast EEZ. Two additional multi-beam sounding systems are proposed as part of the budget increase ($1.1 million) in FY 1987. This will provide expanded multi-beam capability to support bathymetry and our nautical charting efforts.

We plan to produce 1:100,000 scale bathymetric maps from the data obtained. A total of 179 such maps would be required to cover the west coast EEZ. The compiled maps would also be contained on digital data tapes. Eventually, the digital multi-beam bathymetric data will be superimposed by computer graphics on digital GLORIA image data for geologic interpretation. Improved bathymetric fishing maps are another intended product.

The high resolution bathymetric data acquired by the NOAA multi-beam swath survey systems is viewed by the Department of Defense (DOD) as having national security implications. NOAA is working with DOD and USGS, through the National Security Council, to resolve potential security issues presented by high resolution bathymetric data. Only limited data release is being made to users with a "need to know" and the capability to handle classified data, such as USGS, pending a final determination.

In an additional effort to acquire data on the EEZ, NOAA is synthesizing available scientific information for display in a series of comprehensive environmental atlases and data bases. Major data categories include physical environment, biotic environments, living marine resources, economic activities, environmental quality and political/legal jurisdictions. These nation-wide data sets are used by Government and the private sector in decision-making for such areas as offshore oil and gas leases, ocean waste disposal, and oil spill response. The atlas for the Gulf of Mexico has just been published by the Government Printing Office.

Mr. Chairman, I will answer any questions you or the other Members of the subcommittee may have regarding NOAA's FY 1987 budget.

Mr. SCHEUER. Very good. Thank you very much, Dr. Calio.

I have a lot of questions to ask you about Omnistar, but before I do, to make up for my sins in having interrupted you, I am going to yield to my colleague, Claudine Schneider.

Miss SCHNEIDER. Thank you.

Before we get too far afield, let me second the chairman's interest and request for information relating to transferring that information to the African nations who are in need of, more often than not, the technological information. It seems to me that as we are moving toward an information society and that this is one of the valuable ways that we can help the Third World help itself. So, I just wanted to amplify my interest in that.

I am very concerned with some of the more general statements that you made and how those statements are being reflected in this budget. As I have been looking over the numbers, I find some contradictions there. You say, for example, that NOAA is an agency that is promoting science and service.

Dr. CALIO. That is right.

Miss SCHNEIDER. Let's start with the science end of things. Based on your testimony this morning and based on some of the specific numbers that are reflected in the budget request, it seems that the national atmospheric agency is what we are talking about, because the oceanographic end of things seem to significantly have been diminished.

As a matter of fact, as I look over all the cuts, practically all of the atmospheric programs are going untouched and it looks like NOAA will no longer be a major player in ocean programs. I can give you a number of examples, everything from the Atlantic great whale research to striped bass research, the sea grant program, habitat protection, a whole broad spectrum of things.

So, when you look at the percentage cuts that are being supported by you for NOAA, I would like to hear your feedback as to what is happening to oceans programs. Being from the Ocean State, I do have a vested interest, but it does tend to be more global than parochial.

Mr. SCHEUER. May I just footnote that? We are both from ocean States.

Miss SCHNEIDER. But Rhode Island is called the Ocean State, just so we have that straight.

Mr. SCHEUER. I yield to my colleague.

Dr. CALIO. The observation is correct. Of some of the reductions from the currently available, I guess, appropriated 1986 activities, we are down considerably from that number in the ocean or marine fisheries arena.

Miss SCHNEIDER. Now, this is reflected by your personal bias, no doubt, being a man of the space—or is that inappropriately worded—atmosphere.

Dr. CALIO. You see, Mr. Chairman, I have to stay away from satellites because everyone feels that I am taking deep cuts in the oceans program because of my lack of interest or enthusiasm. That isn't the case.

Miss SCHNEIDER. Well, how is it that the biases come about, because it doesn't seem justified by the account of the kind of research that had been undertaken.

Dr. CALIO. Well, a tremendous amount of those reductions have been taken in the marine fisheries. My reaction to that is there is a great deal of consolidation that can be going on in marine fisheries. The amount of money that we had been spending there, I think, is too large. We currently are requesting about $96 million in research in marine fisheries. That is what is in the 1987 budget, not the $130 or $140 that has been spent in the past. I think we can meaningfully reduce that research effort. We can more closely ally it with State activities.

Miss SCHNEIDER. Let us stop there for a moment, because certain areas of research such as the undersea research, the ocean dumping programs are to be eliminated or significantly reduced. And to pick up on something you said, it was because they would be more properly carried out by the State and local governments or by the private sector.

I am real anxious to know what States, if you can name them for me, or local governments have volunteered to do their own research on ocean dumping or on underseas research.

Dr. CALIO. None of them is going to volunteer as long as the Federal Government will pick up the paycheck.

Miss SCHNEIDER. I would say not only will none of them volunteer, but none of them will be capable or competent to carry out that job. First of all, when you look at the moneys that are going to the States, we have proposals by the Administration to completely end all revenue sharing. There are proposals to cut back on a whole broad spectrum of various moneys to States.

So, the question is, No. 1, Where are the States going to get the money to do it? And I will grant you they will not get the money to do it. Second, where is the expertise going to come from? The State of Rhode Island, obviously, which has the best oceanographers in the world in our State, does not have the financial resources or capability to carry on that kind of job.

Dr. CALIO. Let me go to a neighbor right across the Raritan Bay, because I look at Raritan as a regional problem and not a national problem. The State of New Jersey seems to be showing a surplus. Why can't those States work in a compact to try to understand those bays and those estuaries and those coastal regions which are peculiar to them? The ocean dumping or waste dumping associated with that area, as we proceed to understand that and come up with remedies, those regional States will be the ones which benefit from that, not the entire Nation.

So, the point is, why take it from the general tax base?

Miss SCHNEIDER. No, I beg to differ with you. I think that the oceanographic research that is done has not only regional benefit but has national and international benefit. I think that if you look at a regional effort, for example, in the management of striped bass, which is another program that you have slated for elimination, it is important for me to point out that just on Monday of this week, the State of Rhode Island has banned the sale of striped bass because they found PCB's.

Now, without having the research money from the Federal Government to be able to do the monitoring, to do the checking, can you imagine what the cancer rate might be in all the Coastal States along which striped bass migrate, everywhere from the

Hudson and Chesapeake all the way up north to Massachusetts and Nova Scotia?

I think it is important that we look at this in the global perspective, and for us to say that global problems or even large regional problems are going to be solved on a local basis. I think that is a fairy tale. It is just not going to happen. And I think we have to ask ourselves a policy question. Are we willing to see that kind of research go down the tubes, and are we giving up our responsibility to the common good? This isn't just for the good of people who live on the coast. I mean, people who live in Iowa eat striped bass, too.

So, I think to cut $1 million from--to eliminate the striped bass research, for one, it is not going to be possible to continue along that area.

The Ocean Assessment Program is all about marine pollution. You are cutting $5.8 million which is approximately half of the program, and that has to do with monitoring. Now, if NOAA is a service agency and you are cutting out such things as, for example, the Mussel Watch Program where you have 150 different stations and study through a very cost effective means and you have standardized locations, if the various States are going to set up their own monitoring systems, you are not going to have a benchmark, any standardized way of knowing the degrees of pollutants or the degrees of concern. In other words, here is another way that you are casting the health and welfare of the public to the winds.

Dr. CALIO. We are maintaining 75 of those stations today in the 1987 budget. We feel it is our responsibility to establish the standards, and I have to come back again and say once we establish those standards, why can't the States make those measurements against those standards so the data is intercomparable? Why does there have to be a national emphasis or a national program to get standardization or marine assessments throughout the entire coastal region of the United States? Why can't that be done regionally with a given set of standards?

That is the way we operate in other areas. Why shouldn't we operate that way from the standpoint of marine assessments?

Miss SCHNEIDER. Don't you admit that standardization is subject to fluctuation and that by cutting your monitoring stations in half you are only dealing with half the information?

Dr. CALIO. That is true.

Miss SCHNEIDER. I mean, a scientist who only looks at a portion of the problem is not going to be able to define standards that are broadly applicable.

Dr. CALIO. We didn't cut the stations just in one place. We try to keep the 75 existing throughout the Nation so we had an understanding of the variation of those standards and they would be appropriate error bars or statistical analysis or the variations that go with establishing those standards would still be kept intact.

Miss SCHNEIDER. Well, another area that relates to oceans that also relates to my other Committee of Merchant Marine and Fisheries is the Habitat Protection Program. As you know, this looks at the whole impact of habitat loss on important species.

NOAA has played a very significant role in enabling the Corps of Engineers and other agencies to come forward with comments on endangered species, on public health, a whole broad spectrum of

things. I mean, Westway in New York benefited from the information, from the research, from the science that NOAA had put together on that.

I think that is one of the most important offices where research is being undertaken. Yet, that program is being slashed also.

Dr. CALIO. We are still being responsible to the Corps of Engineers, to EPA, and to the Department of the Interior.

Miss SCHNEIDER. And you think you can do that with $5 million?

Dr. CALIO. At the funding level that is remaining.

Miss SCHNEIDER. OK. Well, I have a couple more short questions on science. Overall, your reduction of R&D is 30 percent. I am becoming very much alarmed, and not only am I, but many of the Fortune 500 companies with whom I work. We are having a major conference on international competitiveness the weekend after this one. We are concerned about the direction that research moneys seem to be disintegrating insofar as our commitment to basic science, insofar as our oceanographic research, atmospheric, international, and industrial competitiveness, those kinds of things. Obviously, the bulk of our R&D budget is moving away from energy technologies and other such things and health research into the defense area.

When I look at NOAA's R&D budget of a reduction of 30 percent from $280 million to $196 million for these programs, I am curious to know whether these R&D cuts are based on some kind of philosophical basis or it is on the view that NOAA just does poor quality research?

Dr. CALIO. No; I don't think NOAA does poor quality research.

Miss SCHNEIDER. I didn't expect you to say that, but how can that be amplified by the area that these cuts are being taken in? In what area does NOAA do the best science?

Dr. CALIO. In the atmosphere or the oceans? Which one do you want?

Miss SCHNEIDER. I am curious to know, and as the chairman also mentioned in my ear, what is the rationale behind these cuts in R&D? What is the philosophy?

Dr. CALIO. You keep talking about the cuts. At the same time, the AAAS just finished a study which showed that NAS funding in the oceans just had a 15-percent increase. Is that correct?

Miss SCHNEIDER. Yes.

Dr. CALIO. So, across the Government in the ocean research, there has not been a decrease.

Miss SCHNEIDER. I realize that, but my question is why is NOAA getting out of the research business and shifting that to NSF?

Dr. CALIO. Let me see if I can distinguish the difference between ourselves and NSF. I look at NSF as a basic discipline oriented research organization or funding organization. I don't look at NOAA that way. I think NOAA is a problem oriented research organization.

Miss SCHNEIDER. But yet NOAA is giving up monitoring, giving up sea grant programs, giving up mussel watch.

Dr. CALIO. Giving up monitoring because we think that can be shared. The taxpayer alone should not bear the full burden of those kinds of programs. Industry and the States should take a fair share of that activity.

Miss SCHNEIDER. Well, would that then carry over into your support into the atmosphere in dealing with acid rain when we suggest that legislation supporting acid rain be carried as a burden by the Nation, or should it be carried on a regional basis by those generators of sulphur dioxide and other pollutants?

Dr. CALIO. Let me go back to NAPAP, the National Acid Precipitation Assessment Program. We essentially, through Congress, have a 10-year assessment activity, and we are in the sixth year of it. We hope to, by the end of the decade, be able to reach some assessments and, at that point in time, the costs for doing that research should be shared by others and should not be a further burden on the general taxpayer.

Mr. SCHEUER. Will my colleague yield briefly?

Miss SCHNEIDER. Yes; I would be happy to yield.

Mr. SCHEUER. These aren't all local programs that are being cut. You have a program called TOGA, the Tropical Ocean Global Atmosphere Program, one of your best R&D programs.

Dr. CALIO. Yes, sir.

Mr. SCHEUER. And that is aimed at predicting global weather, especially this continent, the North American Continent. That ain't local, and it ain't State. Yet, there was a substantial cut in that program and a build up of that program in the NSF.

Now, does that indicate, does that suggest to you and should it suggest to us that somebody up there has made a basic decision that they ought to phase NOAA out of the basic research area and that they are somehow inadequate or failing in that respect and that they are not as qualified to do that as NSF? Maybe that decision has been made, but if it has, it hasn't been transmitted to us. And if anybody can make a clear justification for phasing you out of basic research of a global nature that you seem to have been doing quite competently and putting it into NSF, so be it. I wouldn't bridle at that.

Dr. CALIO. No, I wouldn't——

Mr. SCHEUER. But if a basic decision has been made to phase you out of such global research programs and to phase another Government science agency in on research having nothing to do with States and having nothing to do with privatization, then we ought to know about it, and we ought to be discussing that with you.

Dr. CALIO. No, sir. We are not trying to get that message across to you. As a matter of fact, I am a very strong supporter of TOGA.

Mr. SCHEUER. Then how come it is being cut substantially?

Dr. CALIO. What we are trying to seek there is participation by other nations, and we are getting it. As I commented in my opening statement, the Chinese have joined with us. They are making—they will be conducting eight cruises over the next 4 years with our instrumentation on board at about a cost of $12 to $16 million—at a cost of about $8 million. That data will go in and support our efforts in TOGA.

We are trying to work cooperative arrangements with Japan, with Australia, with the European nations. As a matter of fact, the project leader, in my mind, Dr. Mike Hall, is probably one of the best ocean scientists in the business. He works for NOAA and I want it to stay that way.

Mr. SCHEUER. Well, does it help his credibility to see his budget slashed?

Dr. CALIO. We provided about half of what the TOGA planners asked for. In the climate of tight budgets, they can do their job with that kind of money as long as we can bring in other nations to participate in that program. And I think that is to our advantage if we can do that, to the advantage of the United States. Not only do we save ourselves dollars but we also get the participation of other nations. So, it does become a global international program of international significance.

Mr. SCHEUER. Well, I welcome the participation of other nations, obviously, first of all, because the weather is there as well as here. To the extent that we can set up anything approaching a global environmental and weather monitoring service with serious inputs from other nations around the world, that is obviously to be desired and something that this committee has worked very hard on for years. So, we applaud that.

But we don't see how a 50-percent slash in the TOGA budget is aimed to achieve greater credibility for TOGA or for the research component of NOAA. I don't want to belabor this at this time, and I will yield back to my cochair.

Miss SCHNEIDER. Well, I think that along the same vein, we are interested in credibility and the long-term role of NOAA. I notice also that your Status and Trends Program which is designed to evaluate the long-term effect of pollution on marine resources, that particular program is slated for extinction.

What are we doing? I mean, are we going to—is this sort of a subliminal effort to eliminate NOAA as an entity?

Dr. CALIO. No, madam.

Miss SCHNEIDER. Well, it seems that unless we have Federal agencies doing long term, comprehensive research, we are going to end up in crisis management, something that this Federal Government has a strong tendency to keep on doing, and that maybe a couple of years from now when our deficit is reduced to zero; and we will be in fat city, then we will say, oh, my goodness, we have breakouts of this problem and pollution in this area. We have to start and reinvent the wheel all over again.

To me, some of these cuts in R&D seem very, very short sighted. What about the Status and Trends Program? Why is that eliminated for extinction? To me, it seems to be the only real planning long-term element that is part of NOAA now.

Dr. CALIO. You mentioned the part about the mussel watch. That is part of the Status and Trends Program, and half of that activity is still there.

We are still providing $6.2 million in ocean assessments activity. So, the work is not being annihilated or gone to zero. That component in national status and trends is what—$3.9 million.

Miss SCHNEIDER. Which is done from?

Dr. CALIO. Hold on. That is about half.

Miss SCHNEIDER. That is this year. And then next year, do we see the other half go too? I mean, it has been clearly stated that it is slated for extinction.

Dr. CALIO. Who stated that?

Miss SCHNEIDER. That, I believe, was in testimony before the Appropriations Committee last year.

Well, we have one of your staff people shaking her head no and another staff person shaking his head yes.

Dr. CALIO. Let's see if I can get them together.

Let me come back to one of your opening questions about Regional Assessment Programs. What we have done is try to fold the Regional Assessments Program into this oceans assessment activity and try to lose, if you will, the notation that says it is regional where there is applicability from one region to another. So, the regional has been taken out, but the Ocean Assessments Program, the best as I know, has not been slated for extinction.

Mr. SCHEUER. If my colleague will yield at that point——

Miss SCHNEIDER. Yes.

Mr. SCHEUER. We are onto a very basic question here. Your suggestion that a 50-percent cut has been made in this research is of great concern, I think, to both of us. You would have to forgive us for having at least a suspicion that this presages, this extraordinary cut of 50 percent, a phasing out of the entire research component in a matter of 2 or 3 years.

And that brings us to the whole question of what basically is NOAA's role in long-term research in international science programs. What is the role? Is it in data collection? Is it in data archiving? Is it in basic research? Is it in applied research? Is it in none of the above or in all of the above?

Dr. CALIO. In all of the above.

Mr. SCHEUER. Well, what you have been telling us really doesn't give us a great deal of confidence that somebody up there isn't phasing you out of all of these things over a short period of time. We would like you to give us some flat unqualified statements of assurance that this isn't happening.

If it is happening, and maybe it is justified, what does the Government plan to do with all of these research functions? Are these functions being transferred from NOAA to some other agency, or are they just wiping you out of that area of research and not replacing it? What is the long-term master plan for basic Government research, applied Government research, data collection, data archiving in oceanic and atmospheric research. What is the basic long-term plan? And is there a plan afoot to phase you out of it?

Dr. CALIO. No, I don't believe there is any plan afoot to phase me out of it that I am aware of. We are trying to get our costs down, that is for sure. We are trying to stay ahead and on top of advancing scientific activities. I work very closely with and we are aligning our programs between the National Science Foundation, NASA, and the U.S. Geological Survey and ourselves so that we are heading toward the same objectives and applying our skills to getting ahead or advancing science towards these global ocean objectives. We think we can do it with less money.

Mr. SCHEUER. Well, maybe you can. If you can without hurting the total volume and the quality of the research that is going on now, much of it under your aegis, so be it. We wouldn't fight that. But I think you had better give us whatever the master plan is.

Dr. CALIO. I am doing some of that work this year. Hopefully, by the end of the year, I will have a meaningful program together, a

master plan together, and I can present that probably to you in the beginning of fiscal year 1988. I have several studies underway right now.

Miss SCHNEIDER. Mr. Chairman, I am trying to recall now—and maybe, Dr. Calio, you can refresh my memory—how many different ocean related advisory boards do we have in place now? Two, perhaps?

Dr. CALIO. We have the National Academy's ocean studies board. We have the marine board. I guess NACOA is considered part of that.

Miss SCHNEIDER. And there is a new one set up, I guess, just last year. Maybe we have three or four.

Dr. CALIO. I don't think there was a new one. The ocean studies board was reconstituted under Walter Monk.

Miss SCHNEIDER. OK. Well, at any rate, we have about three different, at least in the area of oceans, I am aware of about three different advisory boards. Now, it seems to me that when they have testified before us, all they do is talk about ocean policy, philosophy, directives. Right now, you are saying to the chairman that you are going to provide him with some directives and policy statements, and that leads me to wonder——

Mr. SCHEUER. By the end of the year.

Miss SCHNEIDER. Yes.

Dr. CALIO. Well, I want to put it in sequence with the 1988 program, because I want to be able to go through the normal clearance process for making those studies available. I am interacting with——

Mr. SCHEUER. You know, Senator Pepper says from time to time when somebody talks to him about long-term plans, he says, "At my age, I don't even buy green bananas." [Laughter.]

Now, I don't know if I want to wait till the end of the year. I don't know if I can.

Miss SCHNEIDER. But my question is, do we even need to? Haven't these advisory boards already been providing game plans for NOAA? I mean, isn't that the purpose of some of these advisory boards to give you philosophical directives and what is their value?

Dr. CALIO. I have been interacting with the National Academy of Sciences' ocean studies board since last—in November, we had a major two-day meeting in atmospheres and oceans.

Miss SCHNEIDER. OK. That was last November, but now you—

Dr. CALIO. I haven't heard a thing since.

Miss SCHNEIDER. Really?

Dr. CALIO. I have been trying to interact with them and trying to gain——

Miss SCHNEIDER. It sounds like we better ask them what they are up to, because if you don't have your own philosophical map——

Dr. CALIO. I do have an agenda. I know where I am going.

Miss SCHNEIDER. As to where the agency is going, and they are devising other ones, it seems to me that we are all over the place.

Dr. CALIO. No, we are not all over the place. We are in a Global Oceans Program. We have a part to play in that. We are playing it. TOGA is a good example. Our climate activity is an extremely important part of it. We are working with NSF in carrying out that Global Oceans Program.

Now, we may differ as to the level of effort we are willing to put into it vis a vis other countries.

Miss SCHNEIDER. Well, let me ask you, the National Academy—you asked the National Academy to do a study for you, an evaluation of your R&D programs. What is the status of that study?

Dr. CALIO. The atmospheric group is up to speed, and next month they will have a response on the atmospheric side. With the oceans, there have been difficulties in getting that group put together, and that is throwing no rocks at the ocean studies board.

Miss SCHNEIDER. Oceans just seem to be falling through the cracks.

Dr. CALIO. Well, it is difficult to get those people to work together, but they are getting there.

Miss SCHNEIDER. They need some strong leadership, it sounds like.

Dr. CALIO. They are getting there. I would say in about two or three months, we probably will hear from the ocean studies board.

Mr. SCHEUER. Let me, if my colleague will yield very, very briefly——

Miss SCHNEIDER. Briefly.

Mr. SCHEUER. Let me give you a couple of reports that have been completed and that are available for you. Both the Office of Science and Technology Policy, the OSTP, and NASA's Bretherton Committee have recommended that your agency, NOAA, should play a larger role in the management of environmental data, particularly satellite data. Now, do you agree with OSTP and the Bretherton report and, if you do, how do you propose for NOAA to begin to play the larger role, the leadership role, that I am convinced you are quite capable of playing in environmental data production and management?

Dr. CALIO. I cosponsored that study with NASA for Francis Bretherton to do that activity.

Mr. SCHEUER. OK. But now what are you going to do about it? All the decisionmaking seems to be going in the direction of your relinquishing your role and retreating.

Dr. CALIO. No. Excuse me, sir. I mentioned in my opening statement that we are an information agency as well. We are trying to put the plans together to implement the data handling part of the activity that was recommended by the Bretherton report.

Mr. SCHEUER. Yes, but I regret to say that the NOAA NET Program and the PORT initiatives seem to be moving in the right direction, but they were not funded by OMB. Why not? Who made that decision up there?

Miss SCHNEIDER. While you are on OMB, let me ask at the same time, because this may help you, hopefully, answer the question, have you asked any of the OMB evaluators to look at the overall R&D direction that NOAA is taking?

Dr. CALIO. No, I have not.

Miss SCHNEIDER. Do you think that might be a wise use of their time?

Dr. CALIO. Yes, I do.

Miss SCHNEIDER. Might we expect to see that kind of request of some R&D evaluators?

Dr. CALIO. Yes, you will see that.

Miss SCHNEIDER. Thank you.

Mr. Chairman, might we expect to see a hearing reviewing those OMB recommendations?

Dr. CALIO. Well, you asked me to ask OMB, and I will get a response from that. I don't want to put OMB on the hook to come up and testify. That is up to OMB.

Miss SCHNEIDER. Well, I am just putting the chairman on the spot right now. That is all. I would like him to commit to a hearing to investigate.

Mr. SCHEUER. Madam ranking minority member, I think you and I are as one on this. I don't feel either of us is on the spot. I think we want Dr. Calio and NOAA to play the role that they are capable of playing.

Unless and until somebody comes to us with a credible, responsible, well thought out explanation of why these research responsibilities and these important initiatives in oceanic and atmospheric research of all kinds should be transferred out of NOAA and somewhere else—and this is no reflection on the competence of the National Science Foundation at all—but until we hear a well thought out plan to phase NOAA out of these activities and phase them in someplace else in an orderly, thoughtful way, then I think we both feel that something is rotten in Denmark, and the early warning signals are going up, and the amber light is flashing.

Miss SCHNEIDER. I wouldn't go that far.

Mr. SCHEUER. Yes, I do go that far.

Now, you didn't answer me as to why the OMB didn't fund the NET and the PORT initiatives.

Look, Dr. Calio, I don't want to hang you up on any particular question if you are not fully conversant with it. You can respond the next time you come down in another couple of weeks or you can respond in writing.

But I think it should be evident that we both feel concerned about the general trend of phasing you out, of cuts on the order of 30 percent in your overall research budget, of 50 percent in specific budget items which are dramatic cuts. We cannot sit here simply with our eyes open in complacence and not feel that somebody is sending us a great big fat wet signal. These are signals that we don't want to hear without a very well thought out explanation as to what is going to happen to these science initiatives affecting your entire agency. So, look, we don't want to belabor the point.

Miss SCHNEIDER. Well, I just might add, Mr. Chairman, that when I first looked at the testimony and the outline of where the agency is going, I thought this looks pretty good. You know, we are finding some savings. We will be able to reduce the deficit. That is on the right track.

The difficulty is that I decided to do a little extra homework on this and asked my staff to give me the numbers. When I looked at the numbers, it doesn't relate directly to the total direction that is being articulated. That really concerns me.

So, I think that when we are showing this interest, particularly for the R&D in the agency and also who will pay and who will benefit, we have to look at the questions in a large context, beyond parochial to the global. I think a number of us are concerned that if we are serious about accomplishing the task, we don't see the game

plan of NOAA and how to get from point A to point B. So, you know, that is just what alarmed me last night in looking at these numbers.

Dr. CALIO. Hopefully, you might see a game plan of how the Federal Government, for example, in the oceans, might get from point A to point B.

Miss SCHNEIDER. That I looked at, with the National Science Foundation. So, I looked at the big picture.

Dr. CALIO. Well, we are doing something else. The National Science Foundation, with the Survey, with ourselves, and with NASA are trying to build the very thing you are asking about, how do we work collectively——

Miss SCHNEIDER. Absolutely. That is great.

Dr. CALIO. To move forward on a Global Oceans Program.

Miss SCHNEIDER. But in the process of consolidation and coordination, what is interesting is that certain elements are being completely eliminated, not shifted. I don't mind if they are shifted, because there is too much duplication right now within the Federal Government, and that is fine. But I think we have to state up front that if NOAA is going to get out of the ocean business that you are doing that, and that the job and responsibility for science research is being shifted to NSF. That is fine, but let's be up front about it and state it.

My questions were not so much in things not happening. In some areas, things are not happening. In other areas, things are being shifted to other agencies. But what concerns me is the unrealistic perception that we will let the private sector or we will let the local governments or somebody else take care of the problem, and there is no strategy as to how that might happen or any long-term plan in continuing monitoring and protection of the human good.

We have to run over for a vote, and I regret I will not be able to return, but I thank you, Dr. Calio, for your input. Please realize the concerns of these members on this subcommittee. I am sure our concerns are shared by many of our colleagues. Thank you.

Mr. SCHEUER. Dr. Calio, we will not be returning, because we are going to have a series of roll call votes. You have been very patient with us. I think you are aware of a degree of frustration up here.

I want to reiterate my admiration for the job you have done this year, and I want to assure you that our questions and our seeming frustration are not directed at you personally but is directed at what we consider a programmatic vacuum. We just need some reassurance that you are going to be unleashed to do the job that we think you are quite capable of doing and that you have the commitment to do.

Dr. CALIO. Thank you, Mr. Chairman.

Mr. SCHEUER. Thank you very much for your patience.

The hearing is adjourned.

[Whereupon, at 10:44 a.m., the subcommittee adjourned, to reconvene subject to the call of the Chair.]

APPENDIX I

ADDITIONAL STATEMENT SUBMITTED FOR THE RECORD BY HON. HARRY REID

Congress
of the
United States
House of Representatives

HARRY REID
NEVADA

April 8, 1986

Honorable James Scheuer
Chairman
Subcommittee on Natural Resources,
Agriculture Research and Environment
H2-388 HOB Annex 2
Washington D.C.

Dear Chairman Scheuer:

I find that other commitments prevent me from attending the April 10, 1986 hearings on the NOAA FY 87 budget. I would However request that the enclosed testimony become part of the hearing record.

I appreciate your consideration.

Sincerely,

HARRY REID
Member of Congress

HMR/gb
noaaltr

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TESTIMONY OF THE HONORABLE HARRY REID BEFORE THE SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT ON NOAA'S FY87 BUDGET REQUEST.

APRIL 10, 1986

THE ROLE OF THE ATMOSPHERE IN TRANSPORTING WATER SUBSTANCE FROM THE OCEANS TO THE LAND, APPEARS CLEARLY TO BE A SUBJECT WHICH FITS THE NOAA MISSION.

MAN'S ABILITY TO UNDERSTAND THE ATMOSPHERIC PROCESSES INVOLVED, AND HOW WE MIGHT MODIFY OR EVEN CONTROL THESE PROCESSES, IS OF GREAT POTENTIAL BENEFITS TO OUR NATION. THE GROWING WATER NEEDS OF THE RAPIDLY DEVELOPING WESTERN STATES, THE DROUGHT PROBLEMS THAT SOMETIMES BESET THE HEARTLAND OF OUR COUNTRY AS WELL AS OTHER ARID REGIONS OF THE WORLD, THE EFFECT OF ATMOSPHERIC WATER AND ICE ON AIRCRAFT, ALL OF THESE TOPICS AND OTHERS LEAD ME TO BELIEVE THAT THIS PORTION OF THE HYDROLOGIC CYCLE IS HIGHLY DESERVING OF CONSIDERABLE STUDY.

NOAA HAS, IN THE PAST SEVERAL YEARS, ELIMINATED CLOUD PHYSICS AND CLOUD MODIFICATION RESEARCH FROM ITS PROGRAMS. WE KNOW THAT THE FEDERAL/STATE COOPERATIVE WEATHER MODIFICATION PROGRAM IS ONE OF THE LAST SURVIVING COMPONENT OF SUCH A RESEARCH EFFORT, AND THIS IS ONLY SO BECAUSE CONGRESS RESTORES IT EACH YEAR, ALLOWING HIGHLY COMPETENT WORK IN SEVERAL UNIVERSITIES AND PRIVATE COMPANIES IN THE WEST AND MIDWEST TO CONTINUE.

IN THE PAST THREE YEARS RESEARCH ON WEATHER MODIFICATION , AS PART OF THE FEDERAL/STATE COOPERATIVE PROGRAM BETWEEN NOAA AND FOUR STATES, HAS PRODUCED SEVERAL IMPORTANT AND FUNDAMENTAL FINDINGS.

IN NEVADA, SCIENTISTS HAVE DEVELOPED A NEW CHEMICAL TRACER TECHNIQUE

TO STUDY SEEDING MATERIAL DISPERSION IN COMPLEX MOUNTAINOUS TERRAIN. THEY HAVE ALSO DEVELOPED A NEW STABLE ISOTOPE-ICE CRYSTAL STRUCTURE TECHNIQUE FOR LOCATING THE SNOW GROWTH REGIONS IN WINTER CLOUDS, AND CONDUCT AIRBORNE STUDIES OF THE CAPTURE OF SEEDING AEROSOLS BY CLOUD WATER AND ICE. THESE FUNDAMENTAL INVESTIGATIONS HAVE GREATLY ENHANCED OUR ABILITY TO IDENTIFY MEANS OF AUGMENTING RAIN FALL IN THE MOUNTAINOUS WESTERN UNITED STATES.

IT IS MY IMPRESSION THAT NOAA WOULD RATHER SEE MORE RESEARCH DOLLARS SPENT BY OUTSIDE AGENCIES, UNIVERSITIES AND OTHER COST SHARING PROGRAMS, THAN INCREASE DOLLAR EXPENDITURES IN ITS OWN RESEARCH LABORATORIES.

THE FEDERAL/STATE PROGRAM IN WEATHER MODIFICATION RESEARCH IS A PROGRAM WHERE THIS IS ALREADY BEING DONE AND WHERE THE POTENTIAL FOR IMPROVEMENT EXISTS. I WOULD THEREFORE LIKE TO SEE THE PROGRAM CONTINUE RATHER THAN BE ZEROED OUT AS IS DONE IN THE FY87 BUDGET.

THE NOAA BUDGET FOR FY87 ELIMINATES ENTIRELY THE FUNDING FOR THE REGIONAL CLIMATE CENTER OPERATED BY THE DESERT RESEARCH AGENCY IN RENO, NEVADA. THE CLIMATE CENTER HAS HIRED HIGHLY QUALIFIED PROFESSIONALS, UPGRADED AND PURCHASED NEW COMPUTER EQUIPMENT AND BEGUN ATMOSPHERIC RESEARCH PERTINENT TO THE STATES OF NEW MEXICO, ARIZONA, CALIFORNIA, UTAH AND NEVADA. A STRATEGIC UNDERSTANDING OF WEATHER IS ESSENTIAL TO THE ARID WEST AND THIS PROGRAM ALONG WITH WEATHER MODIFICATION SHOULD CONTINUE TO BE FUNDED FOR JUST THAT REASON.

THERE ARE ADVANTAGES WHEN STATES AND FEDERAL AGENCIES DO THINGS TOGETHER. THE STATES ARE CLOSE TO THE REGIONAL PROBLEMS WHILE NOAA POSSESSES THE ABILITY TO DEAL WITH REGIONAL ISSUES THAT CROSS STATE OR INTERNATIONAL BOUNDARIES. I WOULD LIKE TO SEE THE CLIMATE CENTER AND WEATHER MODIFICATION PROGRAMS REINSTATED SO THESE ADVANTAGES CAN

BE REALIZED. SPECIFICALLY, I WOULD LIKE THE $2,150,000 FOR WEATHER MODIFICATION AND $760,000 (A 5% REDUCTION FROM THE FY 86 APPROPRIATION) FOR THE REGIONAL CLIMATE CENTER PROGRAMS LOCATED IN NEVADA AND ILLINOIS RESTORED TO THE FY 87 NOAA BUDGET.

HARRY REID

MEMBER OF CONGRESS

HMR/gb
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APPENDIX II

ADDITIONAL QUESTIONS AND ANSWERS FOR THE RECORD

SEP 19 1986

Honorable James H. Scheuer
Chairman, Subcommittee on
Natural Resources, Agriculture
Research and Environment
Committee on Science and Technology
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

We are pleased to respond to supplemental questions resulting from the April 10, 1986, NOAA authorization hearing.

If you have further questions, please let me know.

Sincerely,

B. Kent Burton for
Director, Office of
Congressional Affairs

Enclosure

Answers to Questions from the Chairman,
Subcommittee on Natural Resources, Agriculture
Research and Environment
Committee on Science and Technology
For the Record of the Subcommittee's August 10, 1986
Hearing on NOAA's FY 87 Authorization

QUESTION 1:

NOAA is not evaluated by the same division of OMB that evaluates NSF, NIH, and other scientific agencies. Do you feel that NOAA's OMB evaluators appreciate NOAA's scientific mandate? Might this institutional anomaly explain the decline of the research budget at NOAA? Have you tried to have your budget evaluated by a part of OMB with scientific expertise (e.g., the Natural Resources Division)? If not, why not?

ANSWER: Since NOAA is a part of the Department of Commerce, it is important for our budget to be reviewed in the context of overall DOC goals and priorities. Such an evaluation would not be possible if NOAA's budget were reviewed by a separate branch at OMB. In addition, mission-related science is only one element of NOAA's diverse cadre of programs. NOAA's R&D budget is reviewed by parts of the Executive Office of the President with scientific expertise, e.g., the Office of Science and Technology Policy.

The overall reduction in R&D-related activities proposed in NOAA's budget over the last several years does not reflect a lowered commitment to science -- either on the part of NOAA, DOC or OMB. In fact, outside of NWS technology development programs like NEXRAD (Next Generation Weather Radar) and ASOS/AWIPS (Automation of Surface Observations/Advanced Weather Interactive Processing Systems), most of the new starts supported by OMB in recent NOAA budgets have been concentrated in our research programs (e.g., FOCI (Fisheries Oceanography Coordinated Investigation), RITS (Radioactively Important Trace Species), hurricane prediction, Wind Profiler development). Most of the proposed reductions in R&D are for activities that either benefit local and regional governments and the private sector (and should be supported by those beneficiaries) or are of lower priority when viewed in the context of the overriding need to reduce the Federal deficit while still supporting essential NOAA science and service missions.

Satellite Programs

QUESTION 1:

Would elimination of Landsat funding in FY 87 effectively terminate EOSAT, thereby ending the U.S. presence in land remote sensing? What is the minimum amount of subsidy needed by EOSAT in FY 87 to survive?

ANSWER: We do not yet know what EOSAT's decision will be on continuing Landsat without further subsidy, nor do we know what their minimum subsidy would be, if any. If EOSAT determines Landsat can be profitable from data sales, EOSAT is expected to continue Landsat without further Government subsidies.

QUESTION 2:

NOAA claims that it will save approximately $60 million in FY 87 by eliminating the second polar satellite. Yet both the GAO and your own agency (in the "EnviroSat 2000" study) conclude that, over the long run, a two polar satellite system costs less than $10 million/year more than a one polar system. Do you disagree with the conclusions of the EnviroSat 2000 and the GAO regarding the costs of a one vs. two satellite system? If so, why? Do you stick with your conclusion that $60 million would be saved in FY 87 by going to a one-satellite polar system? If so, why?

ANSWER: The NOAA budget analyses in the President's Budget are based on planning launch schedules for one- and two-polar scenarios. The two-polar scenario assumes an average launch rate of one satellite per year. The one-polar scenario assumes a launch rate of one satellite each 18 months. The difference between an average launch rate of 18 months and that of 12 months results in the estimated cost savings of $60 M for a one-polar plan that is reflected in the President's FY 87 budget.

The "EnviroSat 2000" conclusions are based on past experience of actual spacecraft lifetimes.

QUESTION 3:

Over recent years, have you typically spent all the funds Congress has appropriated for polar satellites during the fiscal year in which they were appropriated? How much extra money is available in FY 87 from prior years' appropriations?

ANSWER: NOAA transfers all appropriated spacecraft funding to NASA to fund spacecraft procurements. If the funds are not expended (typically because of schedule delays), we reduce the amounts requested in the next year's budget cycle. The FY 87 request was reduced by $40M to adjust for prior year unexpended funds.

QUESTION 4:

Both the polar and geostationary satellite systems currently have only one operational satellite. When will both systems be replenished?

ANSWER: The NOAA G satellite is completing final pre-launch checks at the Vandenberg Air Force Base launch site. We anticipate that this satellite will be launched as soon as the Atlas E vehicle is certified for flight.

The GOES H satellite has completed qualification at the spacecraft contractors (Hughes Aircraft Company) facility. GOES H was shipped to the launch in early July. Launch is being planned for November 13, following certification of the Delta vehicle for flight.

QUESTION 5:

You have suggested that industry provide an ocean color Imager to NOAA. Has industry stepped up to this challenge? If not, why not? Why do you think that OCI is commercially attractive? Did you request OCI funding from the Department of Commerce or from OMB?

ANSWER: Industry is interested in OCI applications to marine operations and we are presently evaluating the best manner to approach the space-instrument builders. There are at least three companies interested in providing OCIs.

To date, no company has "stepped up" and provided an unsolicited proposal. However, there has been industry interest in terms of dialogue with NOAA and ongoing market analyses. We are treading on new territory with this concept. Unlike many other sensors, only one ocean-color monitoring sensor has flown previously on a polar-orbiting satellite (Coastal Zone Color Scanner on Nimbus-7). There is significant interest by industry in providing this sensor so we are trying to work out essential ground rules for the concept while allowing flexibility and creativity by industry to propose their concepts and approaches.

We had included funding requests for an OCI-type sensor in our preliminary budget submissions. However, we have since concluded that industry interest in and potential benefit from an OCI will result in an industry-funded OCI.

QUESTION 6:

Who will do the research for advanced weather and land sensors -- NOAA, NASA, or the private sector?

ANSWER: NOAA and NASA each have research roles that contribute to the development of advanced weather and land sensors. The two agencies encourage private sector entities to share in and contribute to this research interest. NOAA and NASA, under the provisions of The Land Remote-Sensing Commercialization Act of 1984, Public Law 98-365, have joint responsibility for preparing for the Congress the biannual Federal plan for research in the field of Earth remote-sensing from space, including sensor research. The research needs of the private sector are expressed in this biannual plan. To the extent that it is practical and possible for it to do so, NASA is the agency that has and will continue to be the principal provider of advanced civil weather and land sensors, because of the NASA charter to conduct focused experiments in space research and development. NOAA will contribute to the extent possible appropriate parts of this research through cost sharing, in-situ data support, and other assistance. The private sector is expected to follow a similar path. In instances where urgent sensor research needs of NOAA or the private sector exceed the NASA capacity to support them, the alternative will be to resort to independent, probably commercial, research and development efforts.

QUESTION 7:

NASA is proposing a polar-orbiting platform as part of its Space Station. Specifically, how does NOAA work with NASA in planning for the polar platform? You have requested funding to study "convergence" of NOAA and DOD satellite programs. Doesn't the Space Station tent to "diverge" rather than "converge" the two systems, since DOD will not participate in the Space Station?

In your long-term planning, when do you assume that the Station will be available for NOAA's weather instruments?

ANSWER: NOAA is working with the NASA Office of Space Science and Applications (OSSA) on a payload proposal for the proposed Space Station Polar Platform that would accommodate the needs of both the operational metsat program and the scientific research community. Both NOAA and NASA/OSSA are using the California Institute of Technology/Jet Propulsion Laboratory (JPL) as a common contractor to address the issues of sensor integration serviceability, and communications, as well as spacecraft fuel, power and mass requirements. The NASA Space Station Office has stated that the Polar Platform will be launched and become operational in the mid-1990's. This will make it available at about the time the NOAA K/L/M series runs out. NOAA continues to believe that common instrumentation should be developed for NOAA and DOD use. NOAA has requested funds to study converging its instruments with those of the Defense Meteorological Satellite Program (DMSP). Tentative agreement has been reached with the U.S. Air Force for future procurement of common space environment monitoring systems and atmospheric sounding instruments. At the beginning of May 1986, NOAA placed an ad in Commerce Business Daily requesting industry to submit expressions of interest in developing a design for a system that would combine the capabilities of the imaging sensors on the DMSP and NOAA spacecraft (respectively, the OLS and the AVHRR). A detailed comparison of the NOAA and DOD sensors is given in the EnviroSat 2000 series (Report No. 19) issued in October 1985.

QUESTION 8:

The Land Remote-Sensing Commercialization Act of 1984 (P.L. 98-365) mandates a joint NOAA/NASA R&D plan for civil remote sensing. What is the status of this plan, which is presently nine months overdue?

ANSWER: The final version of the joint NOAA/NASA Research and Development Plan for Civil Remote Sensing has been completed and will be submitted to Congress shortly.

QUESTION 9:

Would you support the concept of Space Grant Colleges similar to Land Grant Colleges and Sea Grant Colleges?

ANSWER: Support for such would not be appropriate to NOAA. Within NOAA's mission, satellites are a tool for garnering data to support specific disciplines and users. As example, a satellite "sounder" augments the radiosonde data in support

of meteorology and the atmospheric sciences. These two sensors are both tools to support specific disciplines NOAA has and will continue to establish centers of excellence in the university system that support disciplines but not the specific "tools."

QUESTION 10:

In 1984, NOAA produced a report at the Committee's request concerning options for greater international cooperation in weather satellites. You reported that greater cooperation was indeed possible, in the form of greater cost-sharing or even creation of an INTELSAT or INMARSAT-like international consortium. What are the pros and cons of creating an international weather satellite consortium? How have you pursued this concept?

ANSWER: Mechanisms for ensuring continuity of weather satellite data through greater international cooperation have been under consideration for some time now. For the past three years, NOAA has worked closely with other countries to encourage greater cost sharing. In 1984, the International Polar-Orbiting Meteorological Satellite (IPOMS) group was established by the Economic Summit of Industrialized Nations to explore ways to increase contributions to the U.S. weather satellite system. Members of IPOMS are Australia, Canada, France, Federal Republic of Germany (FRG), Italy, Japan, Norway, the United Kingdom, the United States, the European Communities, and the European Space Agency (ESA). Through IPOMS, we have developed a consensus on the data and we have developed instrument requirements for the next generation of polar weather satellites and the need for greater cost sharing to reduce the burden on the United States for this satellite system. Canada, France, FRG, Italy, and the United Kingdom have identified specific instrument contributions, and ESA has announced plans to fly a polar platform that would carry meteorological instruments as part of its contribution to the Space Station Program. IPOMS has laid the foundation for a system that will be financed by many nations.

IPOMS is not a formal organization with binding obligations in the same sense as INMARSAT or INTELSAT. It does hold great potential for more permanent arrangements in the future. There are, however, several pros and cons to creating an international satellite consortium. The major advantage is that a consortium would allow for broadbased financial support of the system. Research and development for system improvement would no longer be the financial responsibility of a few nations. On the other hand, the United States would have to relinquish control over its satellite system. Countries that make a contribution to the consortium would expect a level of control over how that system is managed. This could have an impact on the flexibility the United States now has in meeting its data requirements.

7

Research and Development

QUESTION 1:

Tropical Ocean Global Atmosphere (TOGA) is one of NOAA's best R&D programs, aimed at predicting global (especially North American) climate. TOGA is being reduced in NOAA while being increased at NSF. Why? Does this suggest a lack of faith in NOAA's TOGA program? Was the TOGA program evaluated as an interagency request at OMB?

ANSWER: (a) The roles of NOAA and NSF in TOGA are different. While the NOAA effort concentrates on monitoring, data management, and the development of a prediction capability, NSF is charged primarily with funding basic research. The amount requested by NOAA for TOGA will allow NOAA to maintain the observation program in the Central and Eastern Pacific and continue data management activities. The proposed reduction will be accommodated through decreased support to universities and laboratories and presumes increased support from other countries that benefit from the program. The research conducted by NSF is expected to result in a better understanding of the physical processes associated with an El Nino event, an essential ingredient to future improvement and development of prediction models.

(b) To the contrary! It shows great confidence that NOAA can provide a useful product at the requested funding level supplemented by funding from other countries. The research being funded by NSF cannot be accomplished without the data from the TOGA monitoring network and data management activities being implemented and managed by NOAA.

(c) The National Climate Program Act, P.L. 95-367 (Section 5(g)) states, "...The Office of Management and Budget shall review the request for appropriations as an integrated, coherent, multi-agency request." As a result, the National Climate Program Office and the National Climate Policy Board provided integrated budgetary information to OMB on TOGA and other climate activities.

QUESTION 2:

Specifically, how does NOAA evaluate the effectiveness of its scientific research? What is NOAA doing to improve the quality of its research programs?

ANSWER:

NOAA research programs, both internal and extramural, have established review, evaluation, and planning processes that evaluate both the quality and effectiveness of our scientific research. NOAA conducts periodic program reviews that address research being accomplished across NOAA line components. These reviews are attended by NOAA management and external peer reviewers who provide feedback on the quality, quantity, and impact of the research on improving the output of the operational line components of the agency. In addition to these broad program reviews, each NOAA laboratory, Joint Institute, and Sea Grant institution is reviewed by NOAA management and external peer reviewers. These reviews provide the basis for changes in program users, and in identifying new areas that should be pursued by NOAA research programs. NOAA scientists also participate in the NAS, NSF, other agency, national and international working groups that allow exposure and evaluation of the quality of NOAA science against other scientific institutions.

Approximately once per year, a retreat for operational line component managers, NOAA Laboratory Directors, and Sea Grant Directors is held so that the operational line managers can review their research requirements and the quality and quantity of technology and research products being transferred from research to services. The results of these retreats are another input into the planning process that determines the allocation of research resources and the programmatic changes that become part of the yearly budget process.

The Inspector General (IG), GAO, and other audit organizations spend a great deal of time investigating the research being done within NOAA. For example, a review of National Severe Storms Laboratory (NSSL) research was done by the IG to determine if the research was having impact on improving forecasts and warnings of severe weather. The study gave high marks to NSSL's research. The IG also investigated the Profiler program, the Joint Institutes (both atmospheric and oceanographic related programs), PROFS, etc.

The Environmental Research Laboratories (ERL) have established a series of high level advisory groups to help guide the ERL research programs. A committee composed of an Upper Air Sounding Troika and a PROFS Troika (each composed of the Assistant Administrator for Weather Services, the Assistant Administrator for Environmental Satellite, Data and Information Services, and the ERL Director) has been established to make recommendations to the ERL Director. An Equatorial Pacific Ocean Climate Studies (EPOCS) Council has been actively engaged in advising the ERL Director in implementing the EPOCS program. An Atmospheric Chemistry and Monitoring Advisory Group, composed of NASA and

NSF program managers, other agency scientists, and university scientists, has been giving the ERL Director guidance on improvements and directions in long-term monitoring strategy and on the changes required in programs to address new atmospheric chemistry problems. A Solar/Terrestrial Advisory Committee has been established to assure that the quality and quantity of data are sufficient for the users' needs, the research is focused on improving forecasts, and the program responds to the Agency's mission responsibilities. The National Acid Precipitation Assessment Program provides direction and evaluation of ERL acid rain programs.

Each ERL Laboratory has five-year plans, and each NOAA research program area has long-range plans that are reviewed for quality and response to mission responsibility. Each year, ERL's Programs and Plans publication, that reviews previous year accomplishments and the next year's plans, is sent out for information and review.

NOAA is currently working with the NAS through the Board on Atmospheric Sciences and Climate and the Ocean Studies Board to review selected areas of atmospheric and oceanographic research.

QUESTION 3:

NOAA's "Status of Trends" program is designed to evaluate the long-term effect of pollution on marine resources. Why have major reductions in funding been proposed for this program? What effects will these cuts have on NOAA's mandated responsibility to assess the effect of man on oceans and coastal areas?

ANSWER: Activities in (1) water quality sampling and modeling of Mid-Atlantic and Gulf of Mexico coastal waters; (2) applied research and assessments of the consequences of contaminants on coastal and estuarine environmental quality (particularly the effects of toxic compounds on the reproductive capabilities of fish populations; (3) generic ocean disposal assessment and research activities; and (4) the NOAA Quality Assurance Program for Environmental Quality Measurements will continue. Sufficient funds will be available to analyze the first three years' data from the National Status and Trends program. Other continuing activities include the synthesis of information on coastal and EEZ regions under the strategic assessment program and activities related to hazardous materials spill response.

QUESTION 4:

Current NOAA literature reports that last year was the worst year on record for mesoscale weather, yet NOAA research on mesoscale weather is slated for reduction. Why?

ANSWER: During the last two budget years, NOAA has been restructuring the mesoscale research program both to provide new observational capabilities that will augment the NEXRAD program and to improve understanding and forecasting tools for severe weather predictions. In the FY 87 budget currently being considered by Congress, an increased hurricane research program is being requested. This program will improve our capability to forecast hurricane path and intensity variations, reduce the current overwarning along threatened coastlines, and increase the public confidence and response to hurricane warnings and alerts.

The funding for the mesoscale program requested in the FY 87 budget reflects the fact that NOAA has other higher priority programs like profilers and hurricane research and cannot respond to all the needs for better understanding of mesoscale phenomena in years where budgetary reductions are required to solve national fiscal problems.

QUESTION 5:

In testimony before the House Appropriations Committee on March 19, 1986, you defended the proposed Sea Grant rescission by saying that it consists of "21 colleges and 8 institutions... that could compete for funding" with NSF. Further, you questioned whether we "take a segmented portion of the NOAA budget and earmark it for 28 institutions." Lastly, you pointed out that total ocean funding by the Federal government had increased by "500 million."

However, Sea Grant consists of 29 College Programs that encompass almost 300 universities and scientific laboratories, and scientists outside these 300 institutions can also receive research monies from Sea Grant. In contrast, while NSF funding of ocean sciences is much more concentrated, compared to Sea Grant funding, at few universities in very few States (greater than 40% go to universities in only two States, Massachusetts and California). Furthermore, applied research currently funded by Sea Grant could not be funded by NSF, which has a mandate for basic research.

Could you please reconcile these apparent contradictions? Which institutions, competent in ocean sciences, have been denied funding by Sea Grant? Could you supply a detailed listing of the increases in ocean funding about which you spoke? Specifically, address only those increases in R&D funding that could replace Sea Grant funding -- i.e., funding for non-military, applied research in ocean sciences. Of the agencies which are to receive increased ocean funding, how many, like NOAA, have a Congressionally-mandated duty to study the oceans?

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ANSWER: According to the American Association for the Advancement of Science analysis referenced during recent testimony, the FY 87 budget identifies an overall net increase in Federal ocean science programs of $50 million or 15.5% over FY 86 funding. The largest shares of that increase are in NSF ($15 million) and NASA ($52.1 million). Nine million dollars of the NSF increase will be used to enhance research support in physical, chemical, and biological oceanography and marine geology and geophysics. Twenty-nine million dollars of the NASA increase are associated with the new ocean topography experiment known as TOPEX. Academic institutions (including Sea Grant Colleges) will be the recipients of all of the NSF increase and will undoubtedly be key players in the TOPEX program. As premier ocean science institutions, Sea Grant Colleges should be in a good position to compete for and win a good portion of the extramural ocean science funds made available by these increases.

Reference to these increases was not intended to suggest that these programs would "replace" the Sea Grant Program. The Sea Grant Program has fulfilled its original goal of establishing centers of excellence in marine science, education and technology transfer. The type of applied research supported by the current Sea Grant program is now more appropriately funded by the State and regional or private Sector interests which are the principal beneficiaries of the research. Federal marine science funds are more appropriately used to support the kind of long-term, high-risk basic research on high priority national issues which only the Federal Government can support.

12

The National Weather Service

QUESTION 1:

What is the NWS's schedule for phasing in major new technologies?

ANSWER: The milestones for systems development of the major new technologies based on planned funding levels are as follows:

- o Automation of Surface Observations (ASOS)
  - Begin deployment..... Mid FY 89
  - Complete deployment..... Mid FY 92
- o Next Generation Weather Radar (NEXRAD)
  - Begin deployment..... Mid FY 88
  - Complete deployment..... Mid FY 94
- o Advanced Weather Interactive Processing System (AWIPS)
  - Begin deployment..... Mid FY 90
  - Complete deployment..... End FY 94
- o GOES-NEXT
  - Begin deployment..... 1st Quarter FY 90
- o PROFILER
  - Begin demonstration..... FY 89
  - End demonstration..... FY 92

QUESTIONS 2, 3, 4:

Does NOAA have a plan for coordinating technological change with personnel changes? Will these new technologies require more or fewer people to operate them?

What effect will technological change have on the number and location of weather stations?

Last year, you indicated that you would provide a plan for de-politicizing the future closure of local weather stations. What is the status of this plan?

ANSWERS TO ABOVE QUESTIONS: NOAA is now working on a plan for the modernization and restructuring of the NWS in the 1990's. A special committee, with representation from the NWS, NOAA, DOC, OMB and the private meteorological sector, has been

established to work on this, with a target of a completed plan for submission to Congress during the FY 88 budget cycle. This plan will cover the provision of weather services to the entire country, with the NWS restructured so as to maximize the service improvements to the public, while making the most cost-effective use of the new technology. It is expected that, for example, the improvements in efficiency and productivity made possible by the new technology will allow some savings in total staffing of the NWS while still improving services, and that automation of many of the sub-professional activities will allow for a greater degree of professionalism in the total NWS workforce.

QUESTION 5:

The 1985 Farm Bill directed that "agricultural and silvicultural weather services at the Federal level should be maintained with joint planning between NOAA and the Department of Agriculture." Yet the current NOAA budget eliminates funding for agricultural weather and fruit frost programs. What justification can you give for ignoring the clear intent of Congress? Have you formulated plans, as directed by Congress, to plan these services with the Department of Agriculture?

ANSWER: NOAA will maintain public service weather forecasts that are simultaneously useful to general agricultural operations and to other industries. However, the more specific agricultural weather and fruit frost forecast products, which benefit a specific user group, should be provided by private sector meteorologists rather than by the Federal Government. To smoothen the transition from Government to private sector meteorologists, NOAA has held several workshops to assist the private meteorologists to understand agricultural needs for weather services. NOAA will continue to hold such workshops as required, coincident with a phased termination of NOAA services. We are prepared to coordinate these plans with the Department of Agriculture.

QUESTION 6:

The FY 87 budget provides full funding for NEXRAD. What is the NEXRAD schedule with respect to system testing, contract award, and deployment?

ANSWER: Component and subsystem testing in the NEXRAD program began in the fall of 1985 and is currently entering the functional area phase as it builds up to full system testing scheduled for July/August 1986. Current plans provide for a source selection decision late in 1986 and a contract award early in 1987. Initial deliveries of NEXRAD units will commence in the spring of 1989 and extend through 1993.

QUESTION 7:

We understand that NOAA is planning to reprogram several million dollars to cover a FY 86 shortfall at the National Weather Service. What caused the shortfall? What is the status of the reprogramming request? From what programs would funds be reprogrammed?

ANSWER: The shortfall was caused by the Balanced Budget Emergency Deficit Control Act of 1985, P.L. 99-177. Following transmittal of a reprogramming notice to Congress on May 6, 1986, an appropriation was included in the FY 86 Urgent Supplemental Appropriations (P.L. 99-348) for public warning and forecast services and aircraft services. Based on our original intention, the majority of the reprogrammed funds would have come from Information Collection and Analysis, Ocean Research, State and Industry Assistance Programs, and Ocean Services. Other small amounts would have come from Conservation and Management Operations, Sea Grant, Coastal Zone Management, and Mapping, Charting, and Geodesy Programs.

QUESTION 8:

NOAA recently lost a million-dollar suit in New England to families of drowned fishermen who claimed that NOAA was negligent in providing offshore weather information. Are you appealing the decision? What has been the effect of the accident on your operations? Have you been sued on similar grounds over last year's crash of Delta 191 at Dallas/Fort Worth? How often is NOAA sued over claims of faulty forecasts or negligence in providing weather services? How many times has NOAA lost these cases?

ANSWER: The Honour Brown vs. USA litigation involving the loss of three fishermen on Georges Bank was appealed and reversed in the First Circuit Court of Appeals. The decision in favor of the National Weather Service was released May 13, 1986. The Honour Brown litigation did not result in operational or program changes; however, many NWS personnel have a heightened awareness of potential litigation.

The claims in the Delta case are on substantially different grounds than Honour Brown. Since 1972, NOAA has received 208 administrative claims of negligence evolving from 50 aviation accidents (aircraft accidents frequently result in multiple claims). Total monetary attachments in connection with these claims is $871,872,030. NOAA has lost none of these cases.

The agency has been found negligent based on forecast omission or for not amending existing forecasts in connection with two aviation cases. On both occasions, administrative claims were never addressed to NOAA.

In the marine area, suits are relatively infrequent. With the overturning of the lower court decision in Honour Brown, none of these cases have been lost.

QUESTION 9:

After NEXRAD, NOAA will contract for a next-generation weather information and communications system called AWIPS-90. What will the relation be between AWIPS and NEXRAD? Will the two systems share any subsystems? Will the NEXRAD contractor automatically win the AWIPS contract? Will you buy or will you lease AWIPS-90? What are the pros and cons of the two approaches?

ANSWER: As an initial point of clarification, the AWIPS procurement is planned to overlap rather than follow the NEXRAD procurement. NOAA expects to release the RFP for the AWIPS-90 system design competition this fiscal year.

NEXRAD is an observational system and it generates products based on radar data alone. The relationship between NEXRAD and AWIPS is that AWIPS will serve as the integrator that permits NEXRAD products to be used interactively with data from other observing systems such as the automated surface observing system, upper-air sounding system, etc., and with centrally-produced guidance products.

The AWIPS-90 communications subsystem will provide the link for transmission of NEXRAD products among field offices and between field offices and National Centers. This is the only subsystem (excluding interfaces) that will be shared by AWIPS and NEXRAD.

The Department's planned acquisition strategy for AWIPS-90 may be summarized as follows. Multiple AWIPS-90 competitive system design contracts will be awarded after a full and open competition. One contractor from this competition will be selected to proceed with development, deployment, and operation of their proposed AWIPS. The design competition is the subject of widespread interest within industry. Approximately 200 firms, including both NEXRAD competitors, are currently on the list of interested contractors maintained by the AWIPS-90 Contracting Officer. The NEXRAD contractor will not automatically win the AWIPS-90 contract, but is not excluded from offering a proposal.

NOAA is proposing to acquire AWIPS-90 through a service arrangement that emphasizes the provision and maintenance of an up-to-date system capability rather than via traditional buy or lease approaches.

QUESTION 10:

If you did choose to lease AWIPS-90, would you allow greater private sector control and marketing of weather data than is currently permitted?

ANSWER: It is NOAA's long-standing policy to provide access to weather information to all who need it. This includes private sector firms, who play a key role in the dissemination of information and who also provide value-added products specifically tailored to specialized users. NOAA's open access policy will be a requirement of the anticipated AWIPS-90 service contract and will be reflected in other NOAA system and program arrangements.

Privatization

QUESTION 1:

Has NOAA's philosophy toward privatization changed with the departure of Associate Administrator Winchester? What philosophy or guiding principles underlie NOAA's current plans for privatization? Does NOAA have a general plan for commercialization of its activities?

ANSWER: NOAA has completed a thorough review of its privatization activities and has developed an approach with five key elements that is still under review. These are: (1) to establish a credible inventory, schedule, and tracking system for A-76 activities; (2) to assure support and commitment of all top management at NOAA to the A-76 program; (3) to set up a system to accurately track A-76 costs and savings; (4) to improve relations and operations with DOC, including productivity improvement projects and privatization of appropriate functions; and (5) to provide necessary administrative support.

QUESTION 2:

Only about one half of predicted A-76 savings were actually realized in 1984 and 1985. Why have savings consistently fallen short of projections? Does the failure of NOAA to realize projected savings, which are based on a government-wide average, imply that NOAA is less wasteful than the average government agency?

ANSWER: The amount of A-76 savings realized in 1984 and 1985 reflects a learning curve phenomenon that was experienced by NOAA staff assigned to the A-76 reviews associated with the complexities of conducting many reviews simultaneously in varied program areas. Predicting completion of these reviews and therefore when savings would begin was very difficult and not always accurate.

There is no basis available to judge whether NOAA is more or less wasteful than the average government agency. NOAA's A-76 savings per review appear to be in line with that experienced in other agencies.

QUESTION 3:

OMB has proposed new guidelines which would permit agencies to convert activities directly to private operation without going through the A-76 procedure. How and when will these new OMB guidelines affect NOAA?

ANSWER: NOAA is unaware of the implementation date for new OMB guidelines which would permit agencies to convert activities to private operation without going through the A-76 procedure. NOAA is, however, looking at alternative methods, other than A-76, to achieve efficiencies and budgetary savings.

QUESTION 4:

What plans does NOAA have for increasing user fees?

ANSWER: In accordance with Public Law 99-272, NOAA intends, beginning in FY 86, to increase, over a three-year period, the prices of nautical and aeronautical charts to recover all costs attributable to data base maintenance, compilation, and printing and distribution.

QUESTION 5:

Given that transferring a function to the private sector itself has costs -- severance pay, training costs, other transfer costs -- how long does it take before A-76 transfer begins to pay off. If it takes 2-3 years -- as our research suggests -- why does NOAA's budget count the savings before they actually accrue?

ANSWER: Severance pay and other direct costs of transfer from the Government to private sector operation are included in the cost comparison study. Therefore, the savings begin to accrue as soon as the new operation is started. While two to three years is often the total time period elapsed before completion of past NOAA A-76 activities, savings really begin to accrue as soon as a study begins due to limitations on hiring in areas under review and application of early findings to the number and assignment of Federal employees. Unfortunately, there has been no system to measure these interim savings; one is scheduled to be in place by the first quarter of FY 87 under the new NOAA approach to A-76.

QUESTION 6:

NOAA is developing a bad reputation for failing to live up to its commitments. Last year, NOAA reneged on an arrangement to provide the Navy with a satellite for their NROSS program. This year NOAA is reneging on a legal contract with EOSAT. Do you agree with many in industry who say it is more risky doing business with NOAA than with agencies like DOD and NASA? What can you do to resolve this problem?

ANSWER: No, it is not more risky doing buisness with NOAA than with other Federal agencies. All Federal agencies, including DOD and NASA, have long-term requirements that are subject to the same annual priority setting, budget review and decision processes.

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NOAA Studies

QUESTION 1:

Under your administration, NOAA has been the subject of a number of expert studies (many self-initiated) aimed at refining and focusing the long-term missions of the agency. These studies have been conducted, or are currently being conducted by the National Academy of Sciences, NACOA, OSTP, NASA Advisory bodies, and a number of ad hoc panels. Please describe these studies and indicate when we may expect to see findings and recommendations.

ANSWER: Over the past year, I have asked ad hoc expert panels to address two specific issues:

- the need for a national undersea science program; and
- institutional and funding arrangements for fisheries management (i.e., allocation and conservation activities).

The Undersea Research Review Panel started meeting in September and has essentially completed its review. I expect to receive the Panel's final report by September. The Fisheries Management Study group submitted their report to the Administrator on June 30, 1986. The findings and recommendations of both Panels and public comments will be factored into our deliberations on the FY 88 budget this summer.

In addition, the Ocean Studies Board and the Board on Atmospheric Sciences of Climate of the National Academy of Sciences have agreed to review NOAA's programs in terms of national priorities and NOAA's role in overall Federal efforts in the oceanic and atmospheric sciences. Their evaluations have just begun and I expect periodic reports from both Boards as specific issues and/or findings evolve.

QUESTION 2:

Are these studies producing a fundamentally different view of the agency's mission -- that is, will certain current NOAA activities be emphasized and others be discontinued?

ANSWER: The undersea research and fisheries management panels are addressing specific program areas and, while they will include a discussion of NOAA's role in these programs, they were not asked to look at NOAA's overall mission.

I do expect the Academy Boards, however, to address the broader issues of national priorities as well as NOAA's mission responsibilities and appropriate role(s) in national programs in oceanic and atmospheric science and service. Since their reviews have only recently begun, however, I do not know what impact their findings will have on decisions to discontinue and/or emphasize specific programs.

QUESTION 3:

What is your view of NOAA's long-term priorities? What should be the relative roles in NOAA of environmental monitoring and prediction, research, environmental regulation, and commercialization of environmental information?

ANSWER: In my view, NOAA is an oceanic and atmospheric science and service agency. We have specific service responsibilities in areas like weather forecasts and warnings and nautical/aeronautical charting and in certain areas, like marine fisheries, we clearly have specific legislative management or "regulatory" responsibilities. Similarly, NOAA has specific legislative responsibilities for oceanic and atmospheric research in areas like marine pollution and acid rain research. In all of NOAA's programs, the common theme is "prediction." These predictions range in time from warnings of an immediate severe weather threat to long-term changes in climate and air or water quality anticipated as a result of both natural processes and human activities. This is, in my opinion, NOAA's special niche -- that of an "honest broker," supporting the observations, monitoring, research and data dissemination required to protect life and property and provide the scientific information required by resource managers and regulatory agencies.

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Climate and Drought Assessment

QUESTION 1:

Do you recognize the need for an enhanced international research program aimed at understanding tropical (especially African) drought? If so, what should NOAA's role be?

ANSWER: Significant circumstantial evidence exists to suggest the likelihood of enhanced skill on seasonal and perhaps longer time scales in forecasting regional anomalies in distribution and amounts of precipitation in the tropics. The potential value of such skills in the context of food crisis management and in efficient use of relief and development funds appears substantial. Progress depends on continued improvements in understanding how the tropical oceans interact with large-scale atmospheric rainmaking systems and in the development of prediction models that capitalize on such understanding.

NOAA has a strong tradition of contributions in this area, both in the Office of Oceanic and Atmospheric Research and in the National Meteorological Center (NMC). NMC's activity in tropical rainfall assessment and the TOGA program has been the most important facets of NOAA's involvement in this area. The World Climate Research Program (WCRP) builds directly on the Global Weather Experiment (also known as the First GARP Global Experiment) and many of the activities are inseparable, e.g., the development and testing of models that accurately simulate the annual seasonal cycle and the preparation of data sets. NOAA has been the lead for major GARP (Global Atmospheric Research Program) experiments. NOAA also houses the National Climate Program Office which contributes in U.S. planning efforts.

There is a need to continue international research to gain better understanding of the cause of drought in Africa. A better understanding of the causal mechanisms could lead to improved prediction capabilities, leading, in turn, to more efficient use of relief and development funds.

NOAA's role in this research program is to continue its current efforts related to TOGA and other research areas.

QUESTION 2:

What effect would proposed cuts in R&D, in the weather satellite program, and in Landsat have on predicting, monitoring, and assessing African drought?

ANSWER: The continuation of satellite Advanced Very High Resolution Radiometer (AVHRR) data is important for drought monitoring activities in Africa, as the data allow crop yield forecasts to be produced in areas from which little or no surface weather data are received. Corresponding Landsat data do not contribute to drought monitoring, as the 16-day period between orbits is not frequent enough, especially in areas where substantial cloud cover obscures vegetation. When considering the size and scope of U.S. satellite programs, it should be recognized that the loss of reliable transmission of AVHRR data would seriously reduce the ability to quantitatively assess the impact of drought on food production in the Sahel/Horn region of Africa. Many nations are also incorporating NOAA AVHRR weather satellite data into their research and applications programs. This program is particularly important in data-sparse areas such as Africa.

QUESTION 3:

Will funding for the NOAA/AID program in drought assessment continue in FY 87?

ANSWER: NOAA's Assessment and Information Services Center (AISC) submitted a working proposal to the AID Africa Bureau for FY 87-91 in May 1986. Several briefings have been held. Although AISC is optimistic, we do not have a firm commitment. It may be that firm action on this proposal will not be taken until late fall of 1986.

QUESTION 4:

The TOGA program has made tremendous progress in the last few years in understanding world-wide effects of El Nino on climate, and NOAA has recently given an "El Nino alert," which suggests that an El Nino may occur this year. Given these two facts, how does NOAA justify cutting the TOGA program by $3 million? Where are the cuts concentrated? How will this cut affect our predictive ability, especially with reference to African drought?

ANSWER: (a) The amount requested for TOGA will allow NOAA to maintain an observation program in the central and eastern Pacific, the areas critical in monitoring an El Nino event. About 80 percent of this network has been installed with completion planned by the end of 1986. The "El Nino Alert" was intended to be simply a "watch" based on certain sea-surface temperature patterns and the fact that an event has not occurred in four years. It was not meant to imply a forecast that El Nino conditions were actually developing in the eastern Pacific. (Indications are that conditions have now stabilized.)

(b) The basis for a strong international TOGA program has been laid; the World Meteorological Organization has established a mechanism for coordinating and managing the international effort. Although the international program is only now beginning and the magnitude and timeliness of the resources have yet to be determined, it is expected that the support will be primarily concentrated in the Atlantic and Indian Oceans and result in a sufficient observing network. NOAA is also working on bilateral arrangements to increase support from other countries who also benefit from the program.

(c) Recent studies indicate that variabilities in the sea-surface temperature in the Atlantic Ocean may affect precipitation patterns in the West African Sahel. The international TOGA effort should address the issue of monitoring the Atlantic and Indian Oceans as part of efforts to develop an ability to predict the African drought.

International Geosphere/Biosphere Program (IGBP)

QUESTION 1:

What role has NOAA played in formulating IGBP and similar international programs?

ANSWER: NOAA is actively involved in each of the scientific disciplines that are associated with the IGBP. Indeed, the scope of the proposed activities is not dissimilar to the research and service efforts that NOAA conducts. While NOAA does not have an identified program or office specifically devoted to IGBP, many of our scientists conduct research that would contribute directly to its objectives, and many of our information resources -- whether satellites or data archives -- will provide supporting and ancillary information that will be necessary to interpret the scientific results that would result from IGBP.

For over a decade NOAA has been engaged in research and monitoring of the Earth's oceans, atmosphere, and land masses using space and ground-based systems.

QUESTION 2:

What role should NOAA play in implementing IGBP and similar international programs?

ANSWER: NOAA should have a major role in planning of the program to scope out the NOAA role/responsibilities/benefits, especially in the key element of data management.

QUESTION 3:

If, ultimately, there is a U.S. commitment to IGBP or a similar program, would NOAA require additional resources to meet its commitments?

ANSWER: Until the scope of any U.S. commitment is defined, it is difficut to know whether existing resources would be sufficient.

QUESTION 4:

Are the international data centers currently operated by NOAA adequately staffed and funded to handle the expected stream of IGBP data?

ANSWER: No. Resources for long-term data management should be provided to the World Data Centers (WDC-A's) as part of original IGBP research program budget. There are no NOAA funds designated for the WDC-A's.

QUESTION 5:

Both the Office of Science and Technology Policy (OSTP) and NASA's Bretherton Committee have recommended that NOAA should play a larger role in management of environmental data, particularly satellite data. Do you agree with OSTP and Dr. Bretherton? If so, how do you propose to assume a larger role in environmental data management? Did you request funding for such an effort in FY 87 from the Department of Commerce or OMB?

ANSWER: Yes, we agree with OSTP and Dr. Bretherton. NOAA is currently considering ways to cost-effectively respond to user needs and upgrade NOAA's ocean and atmospheric near-real-time data distribution system to handle new instrument capabilities of GOES-90's, AWIPS 90, and other major new data systems. We are also looking into ways to upgrade NOAA's retrospective environmental data management and user services system (DAMUS) to provide more cost-effective data and information management, strategy, processing and delivery.

NOAA, FAA and Aviation Weather Services

QUESTION 1:

The Department of Transportation's Inspector General, in a dratt report, has questioned why FAA is developing a major weather system (Central Weather Processor) similar to NOAA's AWIPS-90. The Inspector General recommended that the FAA should develop a joint program with NOAA. Why is the FAA developing a separate system? Is the FAA dissatisfied with NOAA's plans or with the level of interagency coordination? How do you work with FAA and other agencies to coordinate your weather-related procurements?

ANSWER: The FAA has undertaken a comprehensive modernization of the National Airspace System that addresses all of the functions required to assure safe and efficient use of the Nation's airways. Weather information is one of several important classes of information that are essential to air traffic control and other operations. (Others include aircraft positions, motions, flight plans, airport and facility status, etc.) Aviation weather information must be digested, combined with information from other locations and sources, formulated for easy interpretation by the end user (e.g., air traffic controller, pilot) and routed and presented to the user at the appropriate work locations and display devices. Most of these functions are unique to aviation use and require unique interfaces to numerous subsystems of the National Airspace System.

NOAA works very closely with the FAA. A full-time liaison officer is assigned to FAA Headquarters; formal contacts have been established at many organizational levels, including the regions; structured mechanisms have been established under the Office of the Federal Coordinator for Meteorological Services and Supporting Research, who operates under OMB Charter (Circular A-62). In the specific case of the FAA's Central Weather Processor (CWP) and NOAA's AWIPS-90, a high-level Joint Program Council for Automated Weather Information Systems (AWIS) has been established, chaired by the Federal Coordinator, that includes members from the Departments of Transportation, Defense and Commerce. An active Working Group on AWIS includes representation from the major projects in FAA, NWS and all of the military services.

In addition, working groups on specific topics are frequently established to prepare and coordinate interagency plans or solve specific problems. During the past year, NWS staff have participated actively on such a group established by FAA for the review and refinement of FAA's system requirements definition for the CWP.

In all of these interactions, strong emphasis is placed on ensuring that NWS provides weather support required by FAA in the most effective and efficient way possible within available resources, on fostering inter-operability of weather systems in different agencies through the definition of standard technical interfaces and exchange codes and formats, and on avoiding unnecessary duplication in systems. In particular, NOAA and FAA are currently working intensively to allocate functions between AWIPS-90 and the CWP system and to define the interfaces between them. FAA Headquarters staff report that a revision of the report by the DOT Inspector General is expected to reflect appreciation of this approach.

QUESTION 2:

What are the prospects for funding NEXRAD through the Airport and Airway Trust Fund? In your view, is authorizing legislation required to do so?

ANSWER: Funding NEXRAD through the Trust Fund is technically and legally feasible and is recommended because the NEXRAD system primarily benefits aviation. The Department of Commerce General Counsel has concluded that appropriation language will suffice for such funding, and authorization legislation is therefore not required.

QUESTION 3:

GAO will soon release a report asserting that weather information is still not being provided to pilots in a timely manner, as evidenced by last year's crash in Dallas. What can you do to improve the flow of weather information from NOAA through FAA to pilots? Should meteorologists stationed at airports provide direct radio communications with pilots?

ANSWER: The Aviation Weather Program is a cooperative effort between the FAA and NWS. This cooperation is described in a 1977 Memorandum of Agreement between the two agencies.

One of the major responsibilities of the NWS is to produce the warnings and forecasts in support of the aviation community. The dissemination of this weather information to pilots is the responsibility of the FAA and of the air carriers themselves. The question of how this weather information can be conveyed to those with "a need to know" (including FAA specialists and controllers and users of the National Airspace System) in the most timely and efficient manner possible has been a subject of review for some time.

Attached is a recent letter to Mr. Neal Blake, Deputy Associate Administrator for Engineering at the FAA in response to his request for our thoughts on providing more concise and timely weather information to FAA towers. These proposals are currently being considered by the FAA. We will continue to cooperate with them as the system evolves.

Meteorologists stationed at airports should not have direct radio communications with pilots. A meteorologist's expertise lies in identifying potentially hazardous weather and formulating appropriate warning messages. FAA specialists are trained and experienced communicators. During the landing and takeoff phases of flight, approach, departure, and tower frequencies are extremely busy. Pilots are also extremely busy flying their aircraft. This is especially true during adverse weather conditions. And it would be unreasonable to require a pilot to switch frequencies to speak with a meteorologist to obtain the latest weather information.

Mapping of the Exclusive Economic Zone

QUESTION 1:

NOAA and the Department of Defense are currently involved in a dispute concerning the classification of fine grain maps of the 200-mile Exclusive Economic Zone (EEZ). What is the current status of this dispute? How significant are the scientific and commercial needs for improved seafloor data? Has NOAA estimated the economic worth of such data, and when this data would be useful? Specifically, how many businesses (and which kinds) have asked for this data, and how much do they estimate its worth. Isn't this more properly the responsibility of those business interests? How can NOAA justify this expenditure when money is tight and the data may not currently be released.

ANSWER: High resolution multibeam bathymetry collected by NOAA within the U.S. Exclusive Economic Zone (EEZ) has been deemed classified due to the Department of Defense (DOD) contention that public release of data, which meets International Hydrographic Organization (IHO) standards, is counter to the national interest. The issue of classification was reviewed by a special panel of the National Academy of Science's Naval Studies Board in early 1985. The panel concluded that open dissemination of the data does pose a threat to national security. It was recommended that a measurement system be developed to identify the sensitive regions and that a low pass filter be applied to smooth data in sensitive areas to a threshold agreed to between NOAA and DOD. The panel further recommended that an administrative mechanism be developed to provide for selective release of full resolution data from limited specific sites to support valid geophysical and oceanographic investigations or industry explorations. The panel noted that the need for classification may decline with time and recommended that the issue be reviewed at about two-year intervals.

NOAA and the DOD investigated use of a low pass filter as recommended by the panel, but the approach did not work. Data sensitivity is retained well beyond the point where scientific value is lost. As a result, the Technical Working Group adopted an approach whereby accuracy of the data would be degraded to a level acceptable to DOD yet significantly better than that currently available from NOAA bathymetric map products which do not currently meet IHO standards. Such a product could be used to provide improved bathymetric fishing maps for fishermen, but generally would not be acceptable to scientific and commercial users. Scientific and industrial users will want to access data at full resolution to assure that correct conclusions are being reached.

To date, full resolution data classified "Secret" is being provided to the U.S. Geological Survey, Minerals Management Service, the Environmental Protection Agency, and NOAA researchers. A survey of one site-specific area, Cordell Bank off the California coast, has been approved and released publicly.

At present, algorithms are being developed (the approach and numbers are classified) and will be tested to determine if the risk of deconvolution (restoration of the accurate map) is minimal. This effort is projected to take until late summer 1986 after which NOAA will have to evaluate the effect on its data.

In an attempt to find a mode of operation which might be considered unclassified, NOAA proposed to DOD the possible restructuring of the EEZ mapping program such that only site-specific rather than continuous mapping would be conducted, somewhat like U.S. university multibeam survey ships are doing. DOD has not yet given a final response to NOAA's proposal.

The capability to "sense" the seafloor has advanced significantly in recent years, enhancing our knowledge of plate tectonics and mineral formation and leading to discoveries such as the fact that biologic communities are based on chemosynthesis rather than photosynthesis. Long-range side scan units can provide images of the seafloor, but metric data such as that available through NOAA multibeam surveys are essential for geologic interpretation and assessment. The multibeam surveys provide dimensional data for determination of sizes, shapes, slopes, etc. The NOAA surveys progress at a significantly slower pace than the large area image surveys conducted by the U.S. Geological Survey, thus there is a continual need for NOAA data to support this effort and evaluate the resources of the U.S. EEZ. Commercial mining firms have expressed a need for such data to assess the potential of offshore minerals, but the economic potential is not viable at this time. However, from a strategic standpoint, the U.S. should continue activities which might offset the potential of an embargo of strategic minerals. Multibeam surveys advance our knowledge and assessment of the EEZ and support this need. The potential for curtailment of supply can rapidly turn around the economics of certain minerals as occurred with cobalt when Zaire was invaded in 1978.

Until technical details of the classification issue are worked out, i.e., algorithms are completed, data sensitivities are established, etc., and NOAA's product is properly defined, a valid estimate of economic worth cannot be made. NOAA is conducting an evaluation of the worth of the charting program, but the study is not yet complete.

The usefulness of the EEZ survey program should not be judged solely by its relationship to geological research and minerals. It is no longer in the public interest for NOAA survey ships to continue conducting single-beam depth surveys now that multibeam technology is available. The multibeam survey data acquisition represents application of a new technology within NOAA's survey fleet. Data are intended to be used to improve the existing NOAA product line (charts and bathymetric maps), expand the utility of the data through formation of a high resolution digital data base and facilitate production of special products tailored to user needs, e.g., special plot for mining interests, special map for divers, cataloging data for a marine sanctuary, special plots for deep towed array investigations and submersible operations, etc. Multibeam systems can open the possibility that NOAA can rapidly assess offshore storm damage and provide an improved level of assurance to ships transiting traffic lanes.

Except for Cordell Bank Expeditions (marine sanctuary investigation), no private businesses have been given access to the multibeam data. Ocean Mining Associates has sent personnel to participate in NOAA cruises.

The survey data are made available to a wide range of users who individually probably would not otherwise have access to such data. Fishermen and recreational boaters are not likely to band together to pay for marine surveys in spite of the need. Business interests do conduct site surveys related to oil and gas exploration and production, but these data are typically held as proprietary data available only for a fee. In total, these surveys constitute a patchwork of data estimated to cover roughly 15 percent of the EEZ. The NOAA surveys are systematic surveys conducted to IHO standards in support of multiple uses and provide basic data to support marine activity.

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NOAA and the Department of Commerce

QUESTION 1:

Do you favor organic legislation for NOAA? What are your views about recasting NOAA as an independent agency, which was once proposed as part of the President's trade reorganization plans?

ANSWER: Yes, I believe there could be advantages to bringing all of NOAA's authorizations together in one act.

There are certain advantages to working in the Department of Commerce, in the formulation of the budget as well as implementation of programs. We have a strong and a good Secretary, and that Secretary has a very good relationship with the President and the White House, and I am fortunate that I have a good relationship with that Secretary. If I need access to get a problem solved or whatever, and I have to go to higher authority, I have that capability to get it done and it would get done. We have worked that way over the past four years. However, we are a scientific organization, and if NOAA's activities could be looked at in context of scientific activities, and operational support, and providing technical data to make management decisions, they could be looked at in context with other science activities, I think that would be an advantage. This may or not occur if NOAA had independent agency status.

QUESTION 2:

There is a concensus among private contractors that schedules on major NOAA procurements (e.g., AWIPS-90) have slowed significantly since these procurements have become centralized in the Department of Commerce. Have you heard these concerns? Do you agree with them?

ANSWER: I have not heard any specific concerns. It is natural that contractors would prefer that procurement awards be made quickly. I believe the Department is proceeding as expeditiously as possible.

Ocean Incineration

QUESTION 1:

EPA, in November 1985, issued a tentative permit which would allow Chemical Waste Management, Inc. to conduct research burns at a North Atlantic site 140 miles east of Delaware. However, the State of Maryland recently won NOAA approval to conduct its own review of "consistency" with the State regulations under the Coastal Zone Management Act. Why did NOAA approve Maryland's "consistency" review in the face of EPA recommendations to the contrary? Is NOAA using ocean incineration as a judicial test of the concept of consistency? If so, what are the consequences for the ocean incineration program? Why do you feel the State of Maryland has jurisdiction over a research burn occurring 150 miles from its coastline?

ANSWER: The Federal consistency regulations at 15 CFR 930.54 allow a State to request approval from NOAA to review for consistency with its approved coastal zone management program activities which are not specifically listed as being subject to review in the State program. The regulations state:

> The sole basis for the Assistant Administrator's approval or disapproval of the State Agency's decision [to review an unlisted activity] will relate to whether the proposed activity can be reasonably expected to affect the coastal zone of the State (15 CFR 930.54(c)).

After a review of the materials submitted by the State of Maryland, EPA, and Chemical Waste Management, Inc., NOAA's Director of the Office of Ocean and Coastal Resource Management concluded:

> The transit of hazardous wastes and burning of these materials at sea is a relatively new activity and is not without risk. Therefore, I cannot conclude that in the event of a catastrophic accident in the Maryland coastal zone would not be impacted and so, I find that there is a reasonable expectation that the Maryland coastal zone will be affected by the proposed research burn. (Letter from Peter L. Tweedt to Dr. Jacob Lima, February 7, 1986.)

NOAA's decision to grant Maryland the authority to review the proposed ocean incineration permit was limited by regulation to the grounds stated above. NOAA made no findings regarding, for example: the probability of a catastrophic accident; the capability of the applicant to provide adequate environmental protection during normal operations or in the event of an accident; the actual ecological effects of a catastrophic spill

on Maryland's coastal zone; the consistency of ocean incineration with the mandatory, enforceable policies of the Maryland coastal management program; or the merits of the ocean incineration program.

Subsequent negotiations between Maryland and Chemical Waste Management resulted in an agreement in which Maryland agreed to review the proposed ocean incineration permit but not to invoke any consistency authorities.